The Builder.

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The Jerry-Builder at the Seaside.

AROUND the coast of England are various places to which the inhabitants of large towns, and of London more especially, betake themselves with their families in the late summer or autumn (or at the time of year when those seasons used once to come round), for change of air and in order to breathe for a few weeks at least an atmosphere unpolluted by germs. Of such places there are, however, two very distinct classes. There is the fashionable "watering-place," which is a town by the sea, but a town destitute of the historic or picturesque interest which usually clings more or less about an inland city of any respectable degree of antiquity. The watering-place is a town where everything is modern, and nothing picturesque or interesting. Its modern element is not even the best modern element. Its architecture rises no higher than that of hotels and winter gardens, the class of buildings in which modern architecture reaches the extreme of vulgar and showy commonplace. Its ordinary street houses are worse built and more flimsy than the ordinary street houses of average inland towns; for the very good reason that they are only inhabited for a few weeks in the year, and are then sought after by a crowd of visitors who all want accommodation at once, and who must take whatever they can get. The watering-place churches are examples (as a rule) of the most flaring modern Gothic type. The orthodox charms of the watering-place consist in a long artificially constructed promenade, flanked by a row of hotels or many-storied lodging-houses (a "sea-front," as it is called); an iron pier at right angles to the promenade, projecting out into the sea, and diversified with gimcrack kiosques at the entry and at the further end; and a band on the pier. This is the type of the fashionable watering-place, of which Brighton and Scarborough may be selected as the two most notable examples; others are distributed by a beneficent Providence at intermediate parts of our coasts.

For those who find satisfaction in periodically visiting this class of seaside places, in daily listening to the band or watching each other walk up and down the promenade, these words are not written. It is curious, no doubt, to observe how many people can be (apparently) made happy, or at any rate satisfied, with this artificial parade of a seaside holiday; and we are not uncharitable enough to wish to disturb their joys. But for those of less sophisticated tastes there exist (or did exist) seaside resorts of a very different character; places where no lodging-house architecture has intruded; where bands do not play, nor nigger minstrels pass that way; where no long formal promenade destroys the picturesque line of the sea-coast; where the visitor can find an unadulterated natural sea-beach, perhaps a few fishing-boats giving a little picturesque life and colour to the scene; where, instead of hotels at which it costs five shillings to look at a waiter, and lodging-houses which vie with each other in extortion, one can be entertained at a reasonable cost by some of the kindly old-fashioned inhabitants of the place, who have a simple dignity and courtesy of their own, and who regard the holiday visitor as a friend rather than a prey; where, in short, the dweller in cities can feel that he has for a season escaped from artificial life and come really into contact with the simplicity and healthfulness and picturesqueness of nature.

There "did exist," we say, such places; it seems however, only too likely that they will not exist much longer. No sooner has it been discovered that any small and hitherto untalked-of seaside spot has something of attraction for visitors, than the effort is made to exploit it into a watering-place,—not by any means for the good of the visitors, but for the gain of some persons who regard it as a place to make money out of. This curse of the speculating builder at the seaside has been brought painfully home to us by a communication in the *Pall Mall Gazette* a few days ago, from Mr. F. Henderson, a gentleman apparently residing at what used to be, only three or four years ago, an ideal seaside place of the natural and unspoiled description. Four years since we gave some description, under the heading "A Holiday on the Norfolk Coast," of the charms of Overstrand, the little village near Cromer which had only just then been, as it were, discovered as a seaside retreat. Then it was a little fishing village with an unspoiled sea-beach, with quiet green lanes inland, and open commons overgrown with the bright flower from which it got the name of "Poppyland." "Now," writes a resident in the letter referred to, "all this dream of rest and quiet is over. No poet will sing the praise of Overstrand again. This once lovely village is overgrown with prim villa residences—'desirable mansions,' as the advertisements put it; the peaceful villagers are transformed to veritable harpies of lodging-house keepers" (that we doubt—the "harpies" have been imported) . . . "on the edge of the cliff a great piece of the hitherto open land has been enclosed and boarded round with a blank hoarding that an advertisement agent would envy. Eligible building plots are marked out and enclosed in barbed-wire fencing," &c., &c. Cromer, its neighbour, had gone the same way some years before. Cromer was formerly a little picturesque old-world town clustered around a grand church. Now it is a place overrun with lodging-houses and with a monster hotel, and from which all quiet and repose has departed. Some people, like the correspondent of the *Pall Mall Gazette*, had hoped that at least "Poppyland" would be spared. We were wiser and sadder; we saw a year or two back how things must go, and in fact predicted the change, which is only a type of what is going on everywhere. A place which was a little paradise of its kind is getting ruined to fill the pockets of the speculating builder; and the same history is being repeated wherever a place gets any repute as beautiful and secluded.

The first step in the downward course is generally the arrival on the scene of someone with a title; especially a royal title. The Empress of Austria ruined Cromer; she stayed there some years ago, and forthwith Cromer became fashionable, and was parcelled out into building lots, and the quaint delightful old town swamped amidst gimcrack improvements. A member of our own Royal Family unwittingly and unintentionally did the same ill office for Overstrand. She stayed there two years ago; and forthwith the ground around was staked out and advertised for sale for building lots, an auction was organised, and crowds of speculating builders brought down

by free railway tickets and carted down in brakes on to the ground, like vultures descending on their prey, to plot and contrive the ruin of all that its *habitués* had loved in the place. And the same thing is going on all round the country. Wherever a place gets any kind of repute for being beautiful and attractive, but more than all if any person of social rank and notability goes there, at once it is regarded as land to make money of, and everything which made it really attractive is destroyed by speculators in land and lodging-houses. Every year it is becoming more and more difficult for people who desire repose and quiet and the uncontaminated beauty of nature to commune with in their holiday times, to find any place on the English coast unspoiled by the speculating builder and his villas and wire fences and advertising boards. From time to time a new and unspoiled place is heard of, and is no sooner named in any public print than the conspiracy to ruin it begins. At this rate it will be impossible before long for people whose means or whose family ties confine them to England for their holiday to find any place worth going to—the trail of the jerry-builder is over them all.

Is there no possibility of any check being put to this wholesale desecration? One might really and rationally, in the first place, implore "people of importance,"* especially royalties, to be good enough to hold their tongues about any place they find delightful; to go down there in strict incognito and under feigned names, and say nothing about it to any one. They will do a public kindness if they will adhere to that rule, at least to the minority, though no doubt the majority who rush to kiss the footsteps of great personages will be deeply disappointed and aggrieved. Mortals of more ordinary type, especially such as wield the pen, will be wise to preserve a discreet silence about any beautiful spot that is still left, or only make it known in private to a few chosen friends. A clever author wrote a book on "Poppyland"; a most indiscreet proceeding. We write these words from a seaside place which, though possessing a small hotel and a terrace of lodging-houses, is not yet spoiled of all its natural charms; where there is no promenade and no band; where one can still realise Browning's description—

> "A mile of warm sea-scented beach,
> Two fields to cross and a farm appears:"

but wild horses shall not drag from us the name of it, lest unwittingly we aid in hastening the days of the promenade and band. We feel some compunction at having already been as eloquent as it is permitted to our sober pen to be, on the subject of Overstrand; though we believe, as already hinted, that the real destroyer of the place was the Princess ——, who imprudently (from our point of view) went to reside there, quite unostentatiously, but without absolute concealment. Royal personages should never forget their grave responsibilities in such a case.

To the speculating builder it is of course useless to appeal, with any hope at least of touching his heart in regard to the irreparable mischief he is doing, or of enlisting his sympathies for those who crave to have a few unspoiled places left for them. But there is another argument which may penetrate even his sevenfold hide, and which is also suggested in the letter the perusal of which gave rise to these remarks. The writer adds, in regard to Overstrand, "I am glad to hear that the silly people who think they profit by this are defeating themselves, and that not more than half the usual applications for places have been made this year." There is at least a kind of grim satisfaction to be derived from that consideration. But is it not an extraordinary instance of the perversity of human nature (especially of building human nature), that when it is found that a place is at all sought after because of its natural beauty and quietness, immediately there should be a raid made on it to destroy those very qualities which make it desirable, to take away all its charm, in order to make money out of those very charms which are at the same time destroyed,—to ruin it with one hand, in order to exploit it with the other hand?

"And is it the *Builder*," we hear the speculating critic say, "that sneers at building?" Well, in the first place, in the phrase of the wise man, "there is a time to build, and a time to refrain from building"; and in the second place there is building and building, and we have every right to pose as the enemies of every sort of bad and cheap and rickety building, which is the sort erected by the speculating builder when he fastens on a beautiful spot to raise it to the dignity of a "watering-place." Here, more certainly than in any other situation, do we find jerry-building *in excelsis*; damp walls, floors that shake as you walk over them, doors that do not fit, locks that will not lock, bells that will not ring, and windows that rattle and shriek in the sea-wind. These characteristic defects, bad enough anywhere, are more palpable than ever at the seaside. No doubt new houses may be necessary to enable even a limited number of additional visitors to profit by the beauty of the place. In most cases however, such seaside sites are owned, as far as the land and the building rights are concerned, by some lord of the manor who can control the treatment of the place. It is to those who occupy this position, more than to any others, that we may look to prevent our few remaining spots of natural beauty at the seaside from being irretrievably ruined. Let them see that building is only sanctioned so far as is really necessary, and in such a way as not to spoil the scene, and that what building is carried out is sound as well as picturesque building (the two qualities go together more naturally than many people suppose). Once sell over the rights in the site to a "company," and its day is over for all the better class of visitors; it becomes the paradise of the jerry-builder, the resort of the snob, and those who formerly enjoyed its retired charms sadly shake off its sand from their boots against it, and turn away to some one of the few remaining places not yet discovered and made architecturally and socially hideous, the number of which is becoming smaller every year.

* *Vide* Browning's "One Word More."

THE SECOND NATIONAL MONUMENT COMPETITION AT BERLIN.

AT Berlin the National Monument question has again appeared in the foreground, and has become the topic of the day, not only in art circles, but throughout the capital. We have frequently alluded to the preliminary competition of 1889, and on June 21, 1890 (see p. 444), when the subject was one of much controversy, we published a short account of the project as it then stood. Since then we have mentioned the invitations sent last autumn to a number of artists by command of the Emperor, calling upon them to participate in a "limited" competition for the design, and we have also referred to the great dissatisfaction the "programme" for this competition caused, to the protest which was tendered by the artists invited to compete, and to the very unsatisfactory reply they received. The grievances of the artists, supplemented by the idea that distinct favouritism was shown by the Emperor to one of their number, stood in the way of a good and representative competition, and at one time it was generally supposed that only one candidate, viz., the favoured one, would enter the lists. This has, however, not been the case; three other artists besides the *protegé* have prepared designs for a national monument, and now, after two postponements of the sending-in date (from April 1 till July 1, and then till August 15), the designs have at last been placed before the Emperor, who is to act as assessor and give the final decision, and at the same time the designs have been put on public exhibition in the covered court of the Royal Armoury of the city.

The four competitors are the sculptors Begas, Hilgers, and Schilling, and the architect Bruno Schmitz; the latter assisted in the rendering of his model of the statue by the sculptor Nicholaus Geyer, and the first-mentioned artist aided in the delineation of his architectural surroundings by the court-architect Ihne.

The "programme" required an equestrian statue to the Emperor William, with some appropriate surroundings; a limited site, hemmed in on the front by a water-surface, was indicated; and a background in the form of the main entrance of the Royal "Schloss," on the west front of which the monument was to be placed, naturally influenced the selection of the style for the architectural adjuncts.

Reinhold Begas and Ihne have adapted the style of their design to the suggested background, the architectural part of the scheme, with its rococo lines, matching with those shown on the "Schloss"; while the sculpture, with its restless lines and abundance of movement, comes well up to the attitude assumed at that date. A model, the *technique* of which has elicited great admiration, illustrates Begas's central group or monument proper; it shows the Emperor astride of a broadly-built charger, which is in the act of rearing, but is held down or led by a goddess of Peace. The high pedestal on which this central feature stands surmounts a flight of steps, and on these are lying on the front side a figure representing War, on the back another representing History, whilst on either side of the pedestal, placed at right angles to the centre line, standing on semi-circular extensions of the top step, developed in a masterly way from *bas-relief* to the round, we see two quadrigas, in the one of which stands the figure of the Emperor Frederick III., in the other the Red Prince, these again being flanked by the figures in *bas-relief* or *mezzo-relievo* of Bismarck, Moltke, and other important personages of the reign. Four goddesses of Victory, in a soaring position, mark the corners of the pedestal, the front and rear sides of which show some decoration and text; four lions in the attitude of fierce guardianship, each in charge of quite an armoury of small arms and big guns, mark the corners of the steps. Ihne's architectural framing to the centrepiece (illustrated in a charcoal drawing evidently in imitation of the Bruno Schmitz *technique*) is in the form of a commonplace piece of Ionic colonnading, placed on the waterside of the site, curvilinear on plan, broken in four places, and quite an independent piece of work in itself.

Karl Hilgers exhibits two models. The large-scale one, representing the monument proper, shows us the equestrian statue of the Emperor, whose horse is in quiet movement; the plain basis on which it stands has on one side a relief representing Justice, and on the other one representing Piety. The figure of a young warrior, who is assuming a meditative attitude, and is meant to represent War, has its position on the front. The smaller model shows the architectural framing. Two rows of caryatides, kept together by a light entablature, each a quadrant on plan, are connected by means of an arched niche with columnar supports, in which room is to be found for a large fresco depicting a patriotic incident. The water-side of the monument has been chosen for these, and archways on the outside points of the rows of caryatides, marking the finish on either side, lead to two flights of steps running down to the water level. Each caryatide holds a tablet, on which is engraved some important battle of the deceased's reign. No room has been found for any statesman or adviser of the time; the monument is purely a memorial to the deceased monarch in person.

Bruno Schmitz appears on the scene with two masterly charcoal drawings, each measuring some 15 ft. by 10 ft., together with a model of the equestrian statue by Nicholaus Geyer. This model represents the Emperor

in a pensive attitude, seated on a motionless horse, the whole standing on a pedestal of great simplicity, decorated on the front only with a severe rendering of the arms of the Empire. The main feature of the design consists in the architectural treatment towards the water-side, showing an Ionic colonnade, segmental on plan, with a centrepiece in the form of an archway, under which a bold scheme of fountains and cascades runs down to the water-level. At either end of the colonnade is a tower-like erection, and at the base of each of these turrets we find sculptural representations of War on the one side, and Justice on the other. The adoption of a high balustrade running between the two rows of columns gives sufficient surface for sculptural representations of the chief events of the Emperor's reign, and suitable positions have been obtained for a number of statues of the most important men of the time, the figures of the Emperor Frederick and the Red Prince holding the places of honour on either side of the before-mentioned archway.

Professor Schilling has not employed any architectural adjuncts in his design, and his model of the monument simply shows us the Emperor seated on horseback, both figures in an attitude of rest. The pedestal on which the horse stands is highly decorated in itself, and some figures of Teutonic semblance stationed at the foot, in front and on either side, tend to give the whole a look of greater stability. An ordinary balustrade is shown on the water-side, together with a couple of allegorical figures and some lions.

Public opinion and press criticism on the competition designs show that Professor Hilgers's design is the favourite one, on account of its composition, as well as for its rendering of the equestrian statue of the Emperor. In the architecture of the design some bad mistakes are noticeable, but only in matters of detail that could easily be altered. Next in popular favour comes Herr Bruno Schmitz for his architecture, both for the composition and for the details. The equestrian statue in his design by Nicholaus Geyer is thought to be a failure, as the pensive and aged attitude of the monarch assumed in the model are too realistic, and not appropriate for a memorial. Whilst the *technique* of Hilgers's models does not excite much attention, the draughtsmanship shown by Bruno Schmitz is a great attraction, and the *technique* shown in Begas's model is also very much admired. Begas's composition is, however, the subject of much ridicule; the restless rococo group he exhibits, with its nine horses and four lions, the number of allegorical figures side by side with men in modern uniforms, and its great extravagances in regard to proportion, excite both criticism and laughter. In fact, Begas has once again disappointed the public, and made even the most loyal of burghers wonder how the royal patronage was obtained. In Schilling's model the public see a piece of admirably-modelled Classic sculpture; unfortunately the dearth of life in it, and the non-execution of any surroundings, have, so to say, put this piece of work out of competition.

Nobody even hints that any one of the designs, as submitted, is suitable for erection, and hence this competition, in which four of Germany's best artists have appeared, does not say much for the state of art in that country. A combination of the work of two artists will most likely have to be brought about to obtain a practical result,—a compromise, in fact; and, according to public opinion, Messrs. Hilgers and Bruno Schmitz ought to be selected to work together in the matter. How the decision of the Emperor is going to be framed is not yet known. Up to date no decisive step has been taken, excepting that each of the four artists has received a cheque for 800*l.* instead of the 200*l.* originally intended to defray his expenses, which would, at all events, tend to show that his Majesty appreciates the amount of thought and labour bestowed on the designs by the competitors.

NOTES.

SIR HARRY VERNEY'S suggestion that a county museum should be established for Buckinghamshire is one which is well worth consideration from a general point of view in regard to county museums as a whole. The objection to museums in county towns is that they are generally accessible only to a comparatively small number of the inhabitants of the county. Thus a Buckinghamshire county museum at Buckingham would be less accessible to many of the dwellers in that county than one for Berkshire at Reading, or for Bedfordshire at Bedford. The fact is that local and district museums should be established all over England, so that those who live in particular districts may be able to study the characteristics of the locality. Thus there may be a collection of the local flora, of photographs of local architecture, and so forth, which will give the characteristic features of the immediate neighbourhood. If such museums were established throughout England it would do much to stimulate the interest of the people in their own country, and where a county museum can be also established in a large and accessible county town, such as Chester, where there has been one for some years, so much the better.

M. GOSSET'S lecture on "Les Coupoles d'Orient et d'Occident," delivered before the International Congress of Architects at Paris, has been printed in a pamphlet form,* and forms a very able and concise review of the history and æsthetic of the dome, a form of architectural crown to a building which M. Gosset considers has still a future before it in new treatment and new combinations. He passes in review the principal forms of dome which have been in use in architecture, which are illustrated by elevations, sections, or views of some of the typical domes of the world. Among these is a reproduction of Blouet's restoration of the Pantheon, or, as he frankly calls it, "The Laconicum of the Thermæ of Agrippa," without the portico, which has been so often copied, and which has nothing to do with the original design. Blouet's restoration shows the now built-up arches in the circular portion, which have occasioned so much discussion, as the heads of vast niches, the object of which, however, is not very apparent. M. Gosset speaks strongly in favour of the treatment of the dome always as the central and preponderating feature in the design, and censures both the Florence Cathedral and St. Peter's for the mistake of placing a long nave in front of a dome, thus uniting two elements in architecture which are antagonistic. Hence he is naturally in favour of the Byzantine type of dome, as the most complete architectural type, and as one the treatment of which has not yet been exhausted. And M. Gosset points to this form of architecture with the central dome as peculiarly fitted for the ecclesiastical architecture of the future. His lecture is worth the attention of architects.

THE proposal lately put forward for forming inclined roadways up from the Embankment on either side to the level of Waterloo Bridge, is, as we have already pointed out, hardly practicable, even if it were not open to serious objections. It certainly has no chance of being carried out as long as so many street improvements of more urgent necessity are in contemplation. But, in the meantime, might it not be possible to partially reconstruct, or at any rate repair, the dangerous and dirty stairways (built before there was any idea of a roadway beneath the bridge), which now form the only means of communication between the bridge and the Embankment, and which are very inadequate to the present greatly increased traffic? The treads of the steps are so worn and slippery as to make their descent anything but safe; the flights are much too long, and the fact of the stairways being covered in and containing several dark corners makes their passage sometimes very unpleasant. Here is an opportunity for a really useful, though comparatively inexpensive, improvement, which we hope may not be overlooked among the multitude of grander schemes occupying the attention of our ædiles.

* Reims: MM. Matot-Braine; 1891.

FROM the *Cape Argus* of August 5 we learn that at a meeting of the ratepayers of Cape Town to discuss Mr. Dunscombe's schemes for the drainage of the city, which we before referred to (pp. 43, 62, *ante*), it was resolved "that the Town Council of Cape Town be and are hereby authorised to raise a special loan not exceeding 162,000*l.* for the purpose of carrying out a comprehensive drainage scheme for the city of Cape Town, as recommended by the Government expert, Mr. Dunscombe, and adopted by the Town Council." The scheme adopted unanimously by the Town Council (who, one speaker remarked, were not famous in general for unanimity) is the irrigation scheme, in preference to the outfall scheme. Though it is somewhat the more costly scheme, we have no doubt, taking into account the terms of Mr. Dunscombe's report, that the ratepayers of Cape Town have done wisely, and may even recover their outlay through the increased popularity which will be given to Cape Town as a health resort for Europeans. In regard to a criticism to which we before alluded, that the authorities had previously declined an irrigation scheme by Mr. Pritchard and now accepted a similar scheme from Mr. Dunscombe, we are informed that this was to some extent a misapprehension, as Mr. Pritchard's scheme, though it was also an irrigation scheme, was not in any other sense an identical scheme, as the irrigation site suggested in it was an altogether different one, and details were not gone into. The *Cape Argus*, we observe, in a later issue, withdrew its comment on this head.

AS we recently stated, Mr. C. Innes, architect, will superintend some structural repairs (externally) to St. Mary's, Aldermary, in Queen Victoria-street. That church, serving also for the parishes of St. Thomas Apostle, St. Antholin, and St. John the Baptist, stands in Cordwainer-street Ward, and is distinguished by a tower, in the Pointed style, having four panelled turrets capped with finials, and rising to a height of 135 ft. The body of the church had been erected at the cost of Henry Kebyll, or Kebble, Lord Mayor in 1510 (died 1518), but the tower was added in 1629. A sum of 5,000*l.* under appointment of Henry Rogers's will, in favour of some church unspecified, was applied, by the widow, to the re-building of St. Mary's after the Fire, when, it is said, Wren was constrained to follow the former design, using the materials and the base of the old tower, which bears traces of the fire. The tower suffered much damage by the great storm of November 26-7, 1703, and its upper portion was reconstructed eight years later. The ceilings of the nave, chancel, and aisles have elaborate fan groining of plaster, with large circular and oval panels, deeply indented. The details, however good in themselves, harmonise but ill with the general style. An equally incongruous altar-piece, of the Composite order, was the gift of Jane, relict of Sir John Smith, knight, alderman, who died in 1673. This is now replaced with a more suitable reredos given by Mr. Alfred Dyet, churchwarden of St. Antholin, in 1877. Four years ago Mr. Innes was engaged to design some oaken panelling for the walls. St. Mary's is one of the fifteen churches in the City bearing that dedication, and, according to Stow, the oldest of them all, in which case it must be more ancient than even St. Mary-le-Bow, formerly styled New Mary Church, and founded in, if not before, William I.'s time. In 1835 the demolition

of some houses in Watling-street brought to light, at the east end, a building, 50 ft. by 10 ft., with five arches along each side, which was supposed to be the crypt of Kebble's church. Some of the communion plate, stolen in August, 1889, comprised two or three pierced silver chalices, bearing the name and date, "Mr. A. Brookby, merchant, 1658." The mural monument, by Bacon, in the chancel, is still without inscription: it bears an urn, wreathed, and cherubs' heads. In this church, we are informed, Milton married Elizabeth Minshull, his third wife, when, after his pardon, he had removed to Jewin-street, and completed "Paradise Lost."

THERE is no doubt that the prolongation of the Caledonian Railway system from Greenock to Gourock, which took place about two years ago, is making a great difference in regard to the passenger traffic of the Clyde. Gourock will become the chief point of departure for much of the passenger traffic which is carried down the Clyde to the West Highlands, and to many of the watering-places of the district, and this little town itself is rapidly increasing and becoming an actual seaside suburb of Glasgow. But there is a pressing need of some commodious and good hotels; at present the place possesses but two wretched inns. It is to be observed that passengers who leave Euston at ten o'clock can reach Gourock without change of carriage by eight, and thus complete in one day the whole railway journey to the west coast of Scotland. But this great convenience is useless so long as Gourock is without a satisfactory hotel. The Caledonian Railway Company should build an hotel at the Gourock terminus similar, but on a smaller scale, to their fine and well-managed Central Hotel at Glasgow.

IT is to be noticed in regard to railway enterprise in Scotland, that rapid progress is being made with the West Highland Railway, from Helensburgh to Fort William. On the west side of Loch Lomond, and in Glen Falloch, for example, considerable work has been done. But it must be a matter of serious doubt whether the line will be a commercial success. So far as goods traffic is concerned, the steamship service on the west coast is every year becoming more extensive and better organised, and it is scarcely possible to doubt that the sea route must always have the larger share of the goods traffic. Railway extension, on the other hand, no doubt brings more tourists to the Highlands, the majority of whom have no appreciation of the true beauties of Highland scenery, its lights and shades, its miniature bits of landscape. They would be happier at a crowded watering-place; but we suppose that cheap fares will always tempt tourists, whether the place be suitable or not.

WE have received a syllabus of the evening classes of the Glasgow and West of Scotland Technical College, covering a very large number of subjects. Among these the subject of "Building Construction and Architecture" is treated under three stages, "elementary," "advanced," and "honours" stage: the latter includes the history of the principal styles of the world. Added to this is a course on materials, construction, and hygiene. The "honours" course is, we understand, drawn up with reference to the preparation of students for passing the R.I.B.A. final examination. As far as can be judged from the syllabus, architecture appears to be well looked after in the Glasgow Technical College. Mr. C. Gourlay, A.R.I.B.A., is the lecturer on this class of subjects.

THE sky-sign demon, exorcised (or, we hope, soon to be so) from London, has sought fresh conquests in fields, or rather streets, which we might have expected to remain for ever secure from his deforming grasp. In quaint and quiet Henley-street, Stratford-on-Avon, within a few doors of, and almost overshadowing, Shakespeare's birthplace, has lately been put up an immense sign on the most approved London model, to show the whereabouts of somebody's upholstery warehouse. Let us hope that the Town Council of Stratford may emulate one of the few unquestionably good deeds of our own County Council, and deal with such encroachments in time, before "vested interests" in the air above take away all the picturesqueness which now attracts visitors to Stratford almost as much as its association with the memory of our greatest poet.

AMONG the events of the British Association meeting has been the bringing forward by Sir E. J. Reed of his Channel Tubular Railway scheme, which he recommended for adoption not only as being cheaper than either a tunnel or a bridge, but also on the ground that it could afford no advantage to an invading force, as a small quantity of dynamite applied at any point would destroy it at once. This is perhaps one of the most original ways of recommending a railway work to the favour of the travelling public which ever occurred to an engineer.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT YORK.*

AT the entrance of Aldborough from Boroughbridge, is a curious cross formed of a series of angle-shafts, of fourteenth-century date, in fairly perfect condition, except that the cross head has disappeared, and a later termination has been added. It stood until within recent years at Boroughbridge, in the open space in front of the Hall, and it is said by tradition to have been erected to commemorate the battle at the bridge. There is nothing in the cross to indicate this, although its style accords well enough with the date of the battle, and the tradition is worth recording. A visitor to the village is soon made aware that he is on a site containing unusual objects, since several of the cottages have announcements that Roman pavements can be seen within and that a Greek inscription is to be seen as well as the site of a basilica. To the inspection of these objects the antiquaries proceeded, and every facility was given by the landowner, Mr. A. S. Lawson. The number of the pavements is remarkable, and the artistic beauty of the designs and the freshness and brilliancy of the colouring are very gratifying. But the pavements in existence are but a small number of those, the discovery of which is recorded at an early period, and which are now either not known or which have been destroyed. The narrative of these discoveries was told by Mr. Leadman, who also referred to several destructions, one being so demolished because many curious persons came to inspect, to the annoyance of the then tenant. But others have been removed and sold in more or less genuine state, and the "restorations" of an old native were related, with ample testimony to his skill, which made his frauds all the worse. Two of the pavements form the floor of the scullery of one of the cottages, and here is also preserved a Roman milestone found in the neighbourhood. The occupants walk over the pavements, and have done so for years, no injury having been done to them; but it has to be said that the room is not in frequent use. Another pavement, close at hand, is formed of tesseræ of very minute size, and the central subject, an animal sitting beneath a tree, now very much injured, has been a work second to none in England.

But the principal interest centred in what was described, and apparently correctly, the site of a basilica. It is true that the building does not stand in the centre of the city, nor is it of large dimensions, but still its form is well defined as a central nave, having a porch at the entrance, and a semicircular end, divided originally from the nave by two columns, the foundations of which only remain, although some fragments of broken shafts probably belong to them. Only one half of the building has been recovered and roofed in. But the chief interest attaches to the remains of what has been a very elaborate and remarkable pavement. One of the figures, carefully covered over by a framing of glass, has six Greek letters of an inscription delicately worked in glass mosaic, the colours of the pavement and the inscription being still very vivid. The remains of several other buildings exist, and these show that while the general setting out was at right angles to the city walls, many of the erections were diagonally to them, an arrangement that is visible also at Silchester.

Proceeding to Mr. Lawson's museum, a fine collection of articles of Roman date, found within the city, was inspected. Some of the pottery is of fine Samian ware in admirable preservation. There are a great number of examples of wall decoration and plastering, showing that this was of common use. A portion of the plaster shows by their impress that reeds instead of laths were used for support. The museum is floored with Roman mosaic pavements taken up from elsewhere and relaid. Proceeding through Mr. Lawson's private grounds, and observing a curious place for public cremation, and here and there traces of the main walls of the city, the party regained the roadway, and returned to Boroughbridge, several of the members inspecting on the way some curious sculptured stones, now preserved in the vestry of the modern church of Boroughbridge, removed from the old church which stood in the old market place of the village. These stones are of Norman date, and have formed portions of the demolished fabric.

In the evening, a meeting was held at the York Guildhall, the Rev. Canon Raine in the chair, when papers were read as follow: "Memories of an Ancient House in the Pavement, York," by Mr. J. S. Rowntree: the house in question contains a very good Jacobean chimney-piece; "Notes on the Corporation Regalia," by Mr. G. McGuire, read in his absence, from illness, by Mr. W. de Grey Birch, F.S.A.: the swords and mace were exhibited; and "The Ulphic Oliphant," by Mr. J. H. Macmichael: the horn is of great interest, and is preserved in the Minster in token of the gift of possessions by Ulphus to the Cathedral. A large number of drawings were exhibited of various other celebrated horns, and there was thought to be very good warrant for the Chairman's belief that the Horn of Ulphus is of Eastern origin and design.

Thursday, August 20, witnessed a strong muster of the archæologists and their friends, including many members from the Yorkshire Antiquarian Society, as well as of the York Corporation, among whom were the Deputy Lord Mayor, Sir Joseph Terry, and Mr. C. A. Milward, Sheriff. The day was overcast, but the rain which had diminished the attendance on previous days, was fortunately not conspicuous until the return journey had been begun. Proceeding by special train, Ripon was soon reached, and here the party proceeded to Ripon Minster, where it was met by the Dean, who rendered a hearty welcome to the members in the vaulted apartment used as the Chapter-house, on the south side of the choir. Here the church plate, and various other objects of interest, were inspected, while the Wakeman of the city was present, habited in his robes of office, and carrying the city horn, with its silver chain adorned with many roundels of the same material. The horn is blown at each of the four angles of the Market-cross at nine o'clock every evening, according to ancient custom. The Cathedral was described by the Rev. the Precentor, and the architectural features by Mr. C. Lynam, who had prepared some plans drawn to a large scale. In the library above the Chapter-house the Dean exhibited a curious and interesting series of books and manuscripts taken from the library, among which were a great many early black-letter books in admirable preservation. Several of the party descended into the little vaulted Saxon chamber beneath the central tower, known as Wilfrid's Crypt, which had been lighted up for the purpose.

The party then proceeded to Fountains Abbey, on the invitation of the President, the Marquis of Ripon, who met the members and bade them welcome at the entrance-gates of Studley Park. The magnificent and spacious ruins of the Abbey, standing in the midst of some of the most beautiful of scenery, is a sight to be remembered for a lifetime, and it was apparent that many of the visitors were in the happy condition of inspecting them for the first time. The park and its beautiful timber-trees were seen to great advantage, owing to their freshness of appearance from the constant rainfall of the present season. Proceeding to the long vaulted apartment, called by various names which were mentioned, but of which

* Concluded from p. 163, *ante*.

that of the lay brothers' day-room seemed to find most favour with the company,—although it has evidently been subdivided for other uses as well,—the visitors were invited to luncheon. It was an animated sight. Long rows of tables had been laid lengthwise under the vaulting, and transparent coverings decorated with fern-leaves and ivy had been stretched over the unglazed windows to prevent the admission of cold air, suggesting a very apparent way in which the windows had been originally filled in, there being no groove for glass, although there is a very obvious rebate for a wood frame. After luncheon, the Marquis of Ripon, in a brief speech, said that he was very happy to welcome the members of the Association to the Abbey, which was open at all times for the study of people interested in its elucidation, and that the day, which was that of St. Bernard, was a very fitting one for the visit of such a Society as this.

Mr. Allan Wyon, F.S.A., Treasurer of the Association, replied, thanking the Marquis and the Marchioness, who was also present, for their courteous welcome of the members.

The party then proceeded to make an exhaustive survey of the ruins, under Mr. Loftus Brock's guidance, who, taking up various stations from which the most prominent portions of the ruins could be inspected, while their description was being given, related the history of the rise and progress of the monastery from its commencement to the Dissolution. In this manner the west front, the nave, the space under the tower, from which the transepts could be inspected, the presbytery, from which the eastern portion, called the nine altars, could be seen; then the exterior was treated in the same manner. The first settling of a few monks here, dissatisfied with the lax rule of the Benedictine Abbey of St. Mary's at York, who had separated themselves from that monastery in 1132, was the beginning of the enormous Cistercian establishment here at Fountains. The story of the privations of the handful of monks, for the first two years, is told by one of the inmates who joined a few years afterwards, when wealth began to pour into the hands of the brethren, and a superb church and other buildings were soon erected, but only to be consumed by fire about 1146, in an attack made upon them by the partisans of St. William of York, to whom the monks were obnoxious. Singular, in the history of the abbey, is the fact that it was broken open a second time by a crowd in a later century, but, fortunately, not burnt. While the possessions were enormous, the number of monks does not ever appear to have been very great. This is apparently proved by the number of circular discs to mark their position when forming for processions in the nave, where the number was about thirty-six, although some few more have been found. There were thirty monks and the Abbot, only, here at the Dissolution. The opinion has been not unfrequently stated that of the first church but a very small portion escaped the fire, while the east end (which was of the moderate proportions of Cistercian houses), which is known to have escaped, was rebuilt less than a century later, when the present stately eastern portions were erected, with elaborate detail and elegance of design. Mr. Brock pointed out, however, traces of Norman work in many parts, of earlier aspect than is usual at the known date elsewhere in other buildings, simplicity being the aim of the monks when the first church was erected. He traced them on all four sides of the cloister court, sufficiently so to prove that it was of the same size as in later times. Also that the nave and transepts of the church were no less, since the original work is apparent in various points corresponding with the present west front, the aisles, the south end of the south transept, &c. After the fire some of the earlier work had been plastered over to hide traces of the burning, now apparent, and this had been lined out with a broad, wide line of white to mark out masonry joints. These were apparent also over the work later than the burning, and all had been whitewashed, perhaps at a still later period,—in fact, traces of whitewash remained over almost all the internal stonework. In the space where the central tower stood, the entire area of the choir stalls, which extended in front of the transepts, has lately been cleared out by Mr. St. John Hope, and a continuation of the curious acoustic pottery found beneath them. These were first noticed many years ago, and described by Mr. Gordon Hills. The various efforts made to sustain the weak central tower were pointed out, as well as traces of serious settlements, which, not being arrested by the means used, led to the fall or the removal of the structure, and the erection of the present superb northern tower about 1500. The present pavement in the chancel, of small tiles laid to geometrical patterns, is of ancient work, but doubtless taken up from elsewhere or from a different level, and relaid as it now appears. Before the church was left, it was pointed out that the Nine Altars Chapel of Durham Cathedral was not the original of the corresponding superb work here, but that the reverse was most likely the case, since the work here is twenty years or so earlier in date. The transepts clearly had three altars apiece, but it is open to question as to whether or not the central space was not devoted to a single altar rather than three, thus making seven in all instead of nine. In the chapter-house and elsewhere, a large number of masons' marks are visible, there being hardly a stone which has not had them originally. Right and left of the refectory, which has been a superb apartment, are two others of smaller size, one with two fireplaces, while the westernmost, although evidently once in great part an open court, and afterwards taken in for a building, has been roofed with a high domed roof usual in Mediæval kitchens. There is also trace of a serving-door which swung upon a centre. In the easternmost apartment, which looks like a kitchen, from the existence of the fireplaces, there are no original apertures that would do for serving, but what apertures there are are of late date, cut through the wall as if for entrance of heat. Mr. St. John Hope has lately suggested that the so-called kitchen was the warming-room of the monks, and that the westernmost was the actual kitchen. Mr. Brock contented himself with giving the evidence on both sides, and so leaving the matter, but he laid weight upon the evidence of the actual existence of the fireplaces, which show that, originally, at any rate, the eastern was the kitchen. In the day-room, which had been vaulted at a later period instead of having a flat timber ceiling, the original Norman walling was again shown, as well as the windows of the older dormitory above it, walled up when the later apartment was erected of greater height. Passing three weird-looking prisons, one of the most beautiful of the apartments, the infirmary, was reached. It is now reduced to a sad ruin. Here, at Lord Ripon's suggestion, the party ascended the slope to the south, from which a beautiful view of the valley with the whole of the abbey spread out beneath the spectators, was obtained, showing at a glance how, to obtain space, the rocky cliffs had been cut down on the north, while on the south the little river had been covered with arches, upon which the various apartments in an extended form had been erected.

With reluctance the members and their friends quitted the beautiful grounds and returned to York.

In the evening, the usual meeting for the reading of papers took place in the Guildhall, the Rev. Canon Raine being again in the chair, when the following papers were read:—"Rievaulx Abbey," by Mr. C. H. Compton: in this paper the foundation and progress of the abbey was described in detail. "Some of the Ancient Gods of Britain," by Mr. W. de Gray Birch, F.S.A.: the author described not only two or three extant sculptures of rude form, but gave the names of a vast number of deities, recovered from little-known inscriptions.

Brilliant sunshine caused a goodly number of the archæologists to take train on Friday morning, August 21, to visit the ruins of the famed Cistercian Abbey of Rievaulx, which was reached by a drive from the typical Yorkshire town of Helmsley. Before descending into the valley in which the ruins stand, the extensive and beautiful view from the terrace above them was visited, as well as the temple erected at its nearest extremity, in the taste of the last century. The ceiling of the temple and its cove are covered with fresco paintings of figure subjects, poor enough copies of well-known pictures, but which retain their brilliancy of colour in a remarkable degree, pointing to the excellence in this respect of a very much neglected mode of decoration which has been for too long in abeyance in England. The steep descent to the ruins was no easy task for some of the ladies of the party, especially since the paths through thick but beautiful underwood and trees had not yet become dry from recent rain storms. At the ruins the party was met by the Rev. J. Charles Cox, LL.D., F.S.A., who led the members into the north transept over the irregular mounds which mark the site of the nave. Here he rendered an interesting summary of the history of the building, which was sufficient for the purpose, since Mr. Compton's paper of the previous evening had treated of this subject. His lecture was illustrated by a large plan, which he had measured purposely. Founded in 1131, the building was the earliest establishment of the Cistercian order in Yorkshire, and traces of the earliest building were apparent in the two transepts which remain. In these portions the rude and early nature of the work was pointed out. The joints are wide, the stones are poorly squared, and the openings are treated in the simplest manner possible, no zigzag ornament occurred anywhere, and the workmanship and design would suggest a date of about twenty years earlier were the work met with in any other building than an early Cistercian monastery. Very different, however, was the contrast of the later choir which has taken the place of the small chancel usual in all such establishments when first founded. The choir is a superb work of thirteenth-century date, admirable alike in detail and in workmanship, the whole being of costly and elaborate work of great length and ample height. The ivy has within recent years been stripped from the walls, and all the open joints carefully pointed, and there were many expressions of gratification at this good work performed by the noble owner, the Earl of Faversham. But Dr. Cox had but too much occasion to point out how that these necessary works had now been suspended for several years, and that some of the other portions of the church and of the monastic buildings were getting into a condition all but dangerous.

The members were led successively to the refectory, which has been a beautiful apartment, of two stories in height, owing to the slope of the ground. Then into the monks' day-room, above which was the dormitory, but all these portions, together with the site of the chapter-house, and, in fact, all to the south and west of the central tower, is completely covered over with mounds, grass, and nettles; while the walls are mantled with ivy, which in some places is doing harm. Picturesque in the extreme is the beautiful building, now green with moss, lichen, and ivy, hemmed in by high hills covered with verdure, the imposing dimensions of the ruins being marked by the small cottages which are built close to the ruins, which appear to be the favourite haunt of artists, who are found at most seasons of the year at work with pencil and brush.

The whistle of the hon. sub-treasurer, Mr. S. Rayson, had plenty of demands upon its use to get the many stragglers together from the various recesses of the ruins. When progress was resumed, the journey back to Helmsley was made through Duncombe Park, along the Home Terrace, from which a very extensive view is obtained, and past the ruins of the mansion erected in the style of Vanbrugh, but which was unfortunately destroyed by fire a few years ago, the outbuildings being saved. It was satisfactory to see that active progress is now being undertaken to rebuild the mansion, and by the care taken to leave certain portions of the ruins standing, it is presumably the intention to restore it to the previous design. The parts remaining are sufficient to admit of this being done. After luncheon at the "Black Swan," the members proceeded, some to inspect the fine, over-restored but still interesting parish church, where there is an original Norman chancel arch and south door, later work to the western tower, &c., and a curious fragment of stone covered with Saxon interlaced work, now lying within the porch loose. It should be built up in one of the walls for preservation. On the north side of the churchyard is a curious house, partly of fourteenth-century work, partly of later timbering. Others of the party proceeded to inspect the ruins of Helmsley Castle, which consist of one flank wall and portions of others of a tall keep of early fourteenth-century work, of unusual form for this date. There are two angle turrets, of large size and bold design, still remaining to the keep, which give it a very commanding appearance in the landscape. The entrance gateway is of the same fourteenth-century date, and it stands upon a hornwork, divided from without and from the castle by deep ditches, crossed by causeways of stone. The springing of the arches within it, being the ribs of a depressed

vaulted ceiling, are peculiar and curious, and the castle is from point to point an interesting study of unusual work. The earthworks are most probably of earlier date than the masonry. In close proximity to the castle is a large mansion of Elizabethan date, in ruinous condition, but still retaining its roofs and floors. There is some good panelling, and the plastered ceilings and other parts very excellent in design, but the key of the ceiling is broken, and the plastering has fallen in patches.

The members returned to York very well pleased with the day's proceedings, and with the beautiful scenery through which they had passed.

The usual evening meeting was held in the Guildhall, the Rev. Canon Raine again acting as chairman, and the following papers were read:—"The Peicies in Yorkshire," by Mr. J. P. Pritchett: in this paper, which was one of great erudition and research, the rise and progress of the Percy family was followed, and their connexion with the county traced. "York as an Early British and English Centre of Life and Learning," by Dr. J. W. Eastwood: this paper treated of the first mention of the City of York, of the seat of learning which existed within its walls in early Saxon times, and of the troubles which overtook the city in the Danish and Norman periods. In the discussion which ensued, the chairman gave reasons against the belief which has been held by many writers that Constantine the Great was born in York. This belief can now hardly be held.

Saturday, August 22, was the closing day of the Congress, although an additional day was provided in order that a visit might be paid to Scarborough. Proceeding by train to Selby, the fine Abbey Church was examined. Here the members were met by the Rev. A. G. Tweedie, and Mr. J. P. Pritchett proceeded to describe the architectural beauties of the huge fabric. Taking his stand in the nave, which is now, during the restoration of the building, alone used for divine service, he pointed out the early Norman work of the lower part of the central tower and of the arches which support it, in some of which are settlements, fortunately of old date—which caused the ruin of the upper part of the tower and the sinking of one-half of each eastern arch of the nave in a remarkable degree, the arches being quite disjointed. The work is later in date as it proceeds westward, especially in the upper portion, which, with the west front, all but a superb Norman doorway of great richness and of many orders, is of admirable Early English work. The choir, around which Mr. Pritchett led the party, is a beautiful specimen of Decorated work of the latter part of the fourteenth century. A curious gradation of style in the tracery of the windows is a noticeable feature in the design, those of the aisles having late forms of geometrical design, while the tracery of the clearstory windows is of flowing description. The antiquaries had a good opportunity of inspecting the building, since the restoration, under the direction of Mr. J. Oldrid Scott, is not yet completed, and the floors of the transepts have yet to be laid, as well as much work done in the choir. The restoration is being carried out with great regard for the old work.

Proceeding to Howden, the members after a long walk from the station, which is, by some strange disregard to the convenience of the passengers, placed at a distance of a mile and a half from the town, proceeded to visit the large church, once collegiate, but which is now only the parish church. The lofty tower had been a conspicuous object in the landscape for a long time before it was reached. The choir fell in the seventeenth century, and it remains,—with its beautiful little chapter-house on the south side,—a beautiful ruin of elaborate fourteenth-century work, the chapter-house being of Archbishop Walter Skirlaw's remarkable style of transition from flowing Decorated to Perpendicular. The members were met by the Rev. W. Hutchinson, vicar, but the time at their disposal being extremely limited, no paper was read. The remainder of the afternoon was spent in a second visit to Selby Church, where there was ample material for observation.

At the closing meeting in the Guildhall, which was again presided over by the Rev. Canon Raine, a paper was read upon the "Three Brass Monuments which now remain to the Memories of the Archbishops of York." The paper was by Mr. H. Oliver, but in the author's absence it was read by Mr. T. M. Rickman, F.S.A. The monuments are to Archbishop Greenfeld, 1310, Rob de Waldby, in Westminster Abbey, 1397, and Archbishop Harsnett, in Chigwell Church, 1631, this being the latest brass in which an Archbishop is shown wearing a cope and a mitre. It is a curious example of a brass monument of this late date. The chairman remarked that there had been many more examples in York Minster, but that they had been cut into strips when the pavement was relaid by Lord Burlington in the last century. The blue marble patterns now visible in the pavement is formed by the strips referred to.

The proceedings were brought to a close by a paper on "The Two Judges who confirmed the Rules of the Company of Merchant Taylors of York," by Mr. J. Wilkinson, a paper of much local interest.

Monday, August 24, was an extra day, and the archæologists paid a visit to Scarborough, on the invitation of the Philosophical and Archæological Society of that charming town. The museum was thrown open for their reception, and its miscellaneous collection of curiosities was examined. The existence of the museum has resulted in the preservation of many objects of antiquarian interest which have been found in the locality, mostly in the tumuli, which are very numerous on the wolds near the town.

After luncheon, one of the honorary secretaries of the society, Mr. Phillips, led the party to the ancient castle to inspect some foundations of ancient buildings, which have recently been excavated within the area of the castle walls. These consist of several rectangular apartments, poorly built, and but a very small distance beneath the ground level. There are no distinctive features to denote their age, but Norman fragments were seen to form part of the masonry, reused as old material. Mr. Phillips gave an interesting description of the castle, after which a perambulation was made around the walls, which enclose an area so large in extent as to warrant the belief that the present masonry enclosure is the site of a still more ancient British hill fort. In fact, in one position there are some irregularities in the ground which very much resemble pit dwellings, to which investigation should be directed.

After passing the site of the ancient chapel, the foundations of which are level with the grass, and perfectly visible, the party passed beside the ruined Norman keep and over the arched bridge of approach, to the parish church. Here the Bishop of Hull related the history of the fabric and of the siege of the castle during the civil wars, in which the chancel was battered down by the fire from the castle and the old central tower so greatly injured that it fell down a few years afterwards. Mr. Loftus Brock followed with some notes on the architecture of the church, and drew attention to the bases of two western towers which still remain, and which are shown with their spires on an ancient map, a copy of which is exhibited in the museum, the church having possessed these in addition to the central tower. Some credence was given to the tradition that the second arcade on the north side was removed from the ruin of St. Nicholas's Church, from the fact that old writers speak of the addition of the second aisle when the present tower was erected, after the siege, and from the fact that the design of the arches is different from anything else in the church.

Later in the afternoon a large party of the inhabitants assembled in the Museum to meet the members of the Association. Various papers were read, and the Congress was brought to a close with many hearty expressions of goodwill. The meeting of the two Societies was a very pleasant feature in the proceedings, and one which might be followed on other occasions with advantage.

SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

SECTION VI.—ARCHITECTURE IN RELATION TO HYGIENE.

WE now conclude our special report of this section, which met for the fourth and last day on Friday, August 14, Sir Arthur Blomfield, A.R.A., President of the Section, in the chair.

English Isolation Hospitals.

Dr. Thorne-Thorne, of the Medical Department of the Local Government Board, was announced to read a paper on this subject, but *in lieu* of reading a paper he delivered a speech. He said that in the construction of hospitals for infectious diseases, sanitary authorities should be prepared to deal with two infectious diseases at the same time, both isolated and, with proper arrangements in both, for both sexes; the site should not be less than two acres in extent as a minimum, without counting the space necessary for recreation, or at the rate of twenty beds per acre. Round the buildings there should be an unoccupied zone of at least 40 ft. wide, and in the case of small-pox, somewhat more. Both the design and the construction of such buildings demanded the utmost consideration. It was not right that an infirmary for our sick should be less adapted to health than our ordinary residences. Hospitals should be built with proper walls, never less than 14 in. in thickness. The end to be kept in view should be not merely the successful treatment of disease, but the protection of the public health. In buildings with thin walls the temperature could never be equally distributed, though the wards might possibly be warmed. (Plans by Mr. Keith D. Young were exhibited, showing the distribution of the administrative offices and the two pavilions necessary for the treatment of two diseases at the same time.) One pavilion should always be reserved for odd cases. No pauper was particularly dangerous, but tradespeople, who were likely to spread infection through their wares, clergymen through their congregations, and teachers through their scholars, were the persons whose admission was the most desirable. Each patient should have at least 2,000 cubic feet of air, and should be allowed not less than 12 lineal feet of wall space, nor less than 144 square feet of floor space, 156 square feet being still better. Aggregation was never so good as segregation. A person alone in a room had always more chances of recovery than if treated in presence of other patients. Aggregation was necessary, because segregation in all cases would make it impossible for any large number of patients to be benefited in any locality with the funds at present available. Referring again to Mr. Keith Young's plans, Dr. Thorne showed that it was impossible for any person from outside to communicate with a patient without going through the administrative offices. The disposition was also shown which permitted of a complete separation of the rooms in which the nurses slept and those in which they took their meals. Ward air was always more or less infected, and was never fit for eating or sleeping in. There could be no greater danger to a ward than a laundry in too close proximity. The moist warm air from a laundry had the most injurious effect upon the healthiness of a sick ward. The laundry should be distant not less than 40 ft., and it should itself be isolated. The wards should be made attractive, in order that patients might be readily induced to come into the hospital on the first outbreak of a contagious disease. It was very difficult to carry out the compulsory clauses, or to force people to go into hospital. They must be attracted, not forced. This necessity had been as thoroughly recognised from an architectural point of view by Mr. Young in his plans as he (Dr. Thorne) had recognised it from a medical point of view.

The Heathcote Hospital, Leamington.

Mr. Keith D. Young, F.R.I.B.A., read the following paper on the above-named hospital:—

This hospital was erected in 1889 by the Warwick Joint Hospital Board, the constituent authorities of district being the urban districts of Leamington Spa, Warwick, Kenilworth, Lillington, and Milverton, and the rural sanitary district of Warwick Union. Since the formation of the joint district the districts of

Lillington and Milverton have been amalgamated with the borough of Leamington.

The site is six acres in extent, two and a half acres of which are enclosed and appropriated to the hospital use. It stands on the high ground in the middle of open fields, and is about midway between the towns of Warwick and Leamington.

The population within the joint district was, when the hospital was erected, about 55,000, and of this number some 44,000 were within a radius of three miles from the hospital site. The area of the district is 44,507 acres, and its rateable value 340,000*l*. The accommodation provided is equal to one in every 2,000 of population.

The buildings are four in number, and each is entirely detached from the remainder. They are:—1, the administration block; 2, the isolation block; 3, the ward block; and 4, the laundry block. The site is enclosed on three sides by a high wooden fence; the front towards the high road having a dwarf wall and an iron railing. The two blocks occupied by patients, and the laundry block, are each 40 ft. distant from the boundary, and an inner fence at a distance of 40 ft. from the front gates prevents patients from approaching too near the latter.

The administration block is the only one of the four buildings two stories in height, the rest being one story only. It contains on the ground-floor a sitting-room for the matron and nurses; a room, with a lavatory and water-closet attached, for medical officers; linen-room, water-closet for nurses, kitchen, scullery, and larder, with wood and coal stores, and servants' water-closet in the yard. At one corner of the kitchen is a serving hatch opening into a covered porch at which the meals for the patients are given out. On the upper floor are bedrooms for the matron, nurses, and servants, and a bath-room.

The isolation block is divided into two equal parts by a wall, and the arrangements on one side of the wall are an exact counterpart of those on the other side, the entrance to one side being on the east, and that to the other side on the west. Each half of the building, therefore, contains a large ward for three beds, two small wards for one bed each, a nurses' duty room, and a water-closet and slop-sink. These rooms communicate with each other by way of an open verandah, roofed over at the top, but quite open in front.

Each large ward is 36 ft. long by 18 ft. wide, the smaller wards being 18 ft. by 12 ft., and all are 12 ft. high. The allowance of floor space is 216 ft. per bed, and of cubic space 2,592 ft. per bed. The large wards are lighted by three windows at each end, the smaller ones by one window on each side, being in the proportion of one square foot of window surface to about 65 ft. of cubic space. The windows, which form the principal means of ventilation, are divided into two parts by a transom which is fixed about 1 ft. 6 in. down from the head of the frame. Below the transom are ordinary double-hung sashes, provided with a deep bottom-rail and a cill-board which permits of the lower sash being raised and a current of air admitted in a vertical direction beween the two sashes, at the same time preventing free access of air at the cill level. Above the transom is a "hopper light," hung on hinges at the bottom to fall inwards, and provided with glazed cheeks at the sides to prevent down draughts. In addition to the windows, openings are made at the floor level behind each bed, and provided with Ellison's radiator ventilators; there is also an extraction flue in each ward carried up alongside the smoke-flue, from which it is separated by iron plates. The inlet to the flue is at the ceiling level, and a Bunsen burner is provided with a view to produce an upward current when the fire is lighted. The wards are each provided with a Boyd's hygiastic ventilating grate; these grates have at the back of the fire an air chamber which is supplied with fresh air from the outside. The air being warmed by contact with the heated fire-brick back of the stove, passes into the room through a grating above the fireplace.

The walls of the ward are lined to a height of 5 ft. with tinted glazed bricks, above which they are plastered and distempered. The floors are laid with yellow deal in 3-ft. widths, ploughed and tongued. The vertical angles of the walls, the horizontal angles at the junction of floors and walls and of walls and ceilings, are all rounded, so also are all the angles of door panels and of the windows; and in the finishing of the doors and windows rounded fillets only are used, no recessed mouldings being used anywhere.

The nurses' duty-room is provided with a small range with oven and boiler, and hot water is laid on from the latter to the sink, the movable bath in corridor, and the slop sink. There is also in this room a small dresser, and a glazed porcelain sink. Outside the duty room is a recess, where the movable bath stands. A glazed fireclay sink let into the floor takes the waste, and taps fixed to the wall afford the supply of hot and cold water.

The water-closets and slop-sinks are placed in projecting buildings, entered from the verandah. The walls of these offices are lined with glazed bricks, and the floors are of cement. The slop-sinks are of porcelain, provided with a flushing rim, in addition to the hot and cold water taps. The closets are Hellyer's pedestal hygienic, the trap and basin being made in one piece of porcelain, and are fitted with 3-gallon flushing cisterns, and hard-wood rim seats hinged at the back.

Ward Block.—This building is entered from the centre, and affords accommodation for twelve patients all of one disease, the beds being equally divided between the two sexes. In the open porch at the entrance are two doors; one of these gives access to the entrance lobby, the other being an outer door to the bath-room. The object of the latter is to enable a patient on being discharged to leave the building directly from the bath-room. The bath-room thus becomes a discharging room; not, perhaps, an ideally perfect arrangement, but certainly a better one than if the patient had to re-enter the ward after his final bath. To the left of the entrance is a smaller cupboard with a window for food, and opposite are cupboards for patients' clothes and linen. Between the wards is the nurses' duty room, in which is a small range with boiler for supplying hot water to the bath, sinks, and lavatory basins, a dresser, and a porcelain sink. The wards are each of them 36 ft. long and 26 ft. wide, and contain six beds each. To each bed is allotted a floor space of 156 ft., and a cubic space of 2,028 ft., and the distance from centre to centre of each bed is 12 ft. The window area is in the proportion of about 1 ft. of window to every 60 ft. of cubic space. The means of ventilation are similar to those adopted in the isolation block. The grates also are similar, but in these wards are placed in pairs, back-to-back, in the centre of the floor, with descending flues carried under the floor to vertical chimneys in the outer wall. The latter are swept from the outside. The water-closets and slop-sinks are placed in the projecting buildings at the end of the wards, from which they are separated by cross-ventilated lobbies. The construction of these wards, as regards internal finishing of floors and wall surfaces, &c., is in all respects similar to that of the isolation block. A speaking-tube connects the duty room with the administration block. The laundry consists of a wash-house fitted with the usual appliances for washing, an ironing-room, and a drying-room heated by the flue of the ironing stove, and fitted with a radial drying-horse. Adjoining is a water-closet and a coal-store.

The disinfecting house is divided into two parts by a brick wall. The apparatus, which is one of Washington Lyon's high-pressure steam machines, projects on each side of this wall, so that the infected clothes are put in in one chamber, and when disinfected are taken out by the door in the other chamber.

The mortuary is a plain sky-lighted room, arranged for use, when necessary, as a *post-mortem* room. The ambulance house affords accommodation for a one-horse ambulance.

Drainage and Water Supply.—The drainage system is a dual one, the rain-water being separated from the sewage and stored in a tank for use. The drains are all laid with glazed stoneware pipes jointed with cement, with manholes at each junction and change of direction. Each length of pipe between the manholes was separately tested with water before being covered up, and all the pipes are laid on and partly embedded in concrete. At the head of every length of drain is a Doulton's 30-gallon automatic flushing tank, and at the outfall to the public sewer is a large flushing tank fixed by the town authorities. These flushing tanks were specially necessary in this case, as not only is the quantity of sewage discharged at one time necessarily small, but the sewer conveying the hospital sewage to the town sewers has to traverse a long distance before it comes near any other buildings. The soil pipes are carried up above the eaves of roofs their full diameter as ventilating shafts. The rain-water from the roofs is all collected into an underground tank, first passing through a filter chamber formed partly of coarse and fine gravel, and partly of charcoal. From the tank it is pumped for use in the scullery of the administration block and the wash-house.

The cost of the hospital was as follows:—

1. Land	£900	0	0
2. Buildings, including laundry fittings, disinfecting apparatus, roads, paths, fences, drains, and professional charges	7,635	10	6
3. Gas-mains, from nearest point up to site	84	4	4
4. Water-mains	161	10	11
5. Sewer	299	4	9
6. Furniture	293	17	7
	£9,374	8	1

To meet this outlay, loans were obtained from the Loans Commissioners to the extent of 9,316*l*, at 3½ per cent., repayable in thirty years. The interest and repayment of principal amounts to an annual sum of 630*l*., which is met by a rate equal to seven-sixteenths of a penny in the pound.

As regards cost of maintenance, it is not very easy to arrive at a definite figure in regard to a hospital which is liable to be occupied or not in so absolutely uncertain a way as this; but assuming the wards were empty for twelve months continuously, it is estimated that the cost of maintenance for that period would amount to 370*l*. This sum includes the following expenses:—Clerk, medical officer's retaining fee, steward, matron, caretaker, out-door porter, nurse, rations for residents, coal, gas and water rates and taxes. For the statistics as to cost, and for much valuable information I am indebted to Mr. Alderman Wackrill, the Chairman of the Joint Board.

Local Isolation Hospitals as Opposed to a Central Hospital.

The Rev. C. E. Few, Vicar of Seal, Sevenoaks, next read a paper bearing the above title. It was as follows:—

It seems to me a question well worth considering, whether it is not on the whole far better to treat fever cases in the locality where they arise, rather than to transport them to large central hospitals. I am speaking only for country districts, having no experience in towns; possibly there large central hospitals are best. It is, of course, impossible to go into such a vast subject as this in the brief time allotted to those who have the privilege of reading a paper at such a Congress as that now assembled. It is only just possible to treat of some of the great pros and cons, and so leave the public to decide whether or no the present system is unwise, and needs consideration, and perhaps alteration.

All hospitals require careful management and supervision; this, of course, is possible in ordinary hospitals, as committees of laymen can visit and judge for themselves. In fever hospitals this is more difficult, especially in country districts,—the hospital being probably placed in some out-of-the-way place, and rarely visited by any except those in charge, the outside public being practically excluded. Local hospitals would naturally be more under supervision.

It is of the utmost importance to make the hospital system popular, because, notwithstanding all Acts of Parliament, poor people cannot be compelled to have doctors at all; and many a case has been and will be hushed up and treated at home, particularly when children can be compulsorily removed to some out-of-the-way distant place, to which the parents would have to walk and lose a day's pay if they wished to inquire.

Local hospitals would certainly minimise this difficulty; the position would be known; kindly local interest would probably do its best to make each hospital as complete and attractive as possible; and the residents would have the feeling that all care expended on the hospital would be for the benefit of their own poorer neighbours; and the cottage-owners in the district should be taught that by arranging for local treatment they were but providing that spare room accommodation which they are able to enjoy in their own houses, but have, as a rule, failed to provide for their cottagers. It must not be forgotten that the removal of

patients can only be enforced where there are not means for isolation at home.

A large central hospital is doubtless damaging to the value of property, not only in the immediate neighbourhood, but in the district generally, inasmuch as all the fever of an area of, perhaps, some fifteen or sixteen miles in breadth is liable to be carted into it along the country roads. If the fact of this central hospital would free the rest of the district, the argument that some rather than all should suffer might very properly be urged; but no one pretends that this is the case, doctors only speaking of moving about 60 per cent. of the cases; and if only 5 per cent. is left behind, it is enough to start all the mischief over again. The ambulance risks are twofold; to the patient, and to the neighbourhood. No bad case could be moved at all, certainly not for any great distance; and surely the risk of conveying infected people through village streets and amongst the ordinary curious people of the world must be dangerous; and certainly the law as to a zone of 40 ft. cannot be observed.

The cost of a permanent hospital unoccupied must be a very heavy charge, and this, possibly, for months together.

Alternative Scheme.—The alternative scheme I would suggest is to map out every district, and to choose sites suitable for treatment of fever in a certain area,—the smaller the better; to prepare these sites as to drainage and water supply, and to place on each a small iron room, with walls about 8 ft. high, to be used as a kitchen and laundry; the rain to be collected in a tank for washing purposes.

The sanitary authority should provide a certain number of portable hospitals,—say two for each relieving officer's district, and two extra ones to be kept at the union house on a two-wheeled cart, like a lifeboat, ready for immediate transmission, if required, to supplement the two local wards. These rooms should be capable of holding three, or, at a push, four patients. If cottages could be secured for kitchen and nurse, so much the better; but, if not, portable rooms suitable for the nurse should be provided, one for each relieving officer's district.

These sites may be in meadow lands, 40 ft. from the road, the iron room surrounded with a barbed iron fence sufficient to enclose it, with the understanding that, when occupied, the zone of 40 ft., if considered necessary, should be wired off. The nearest point on the road could be, when required, connected by a wire to run a basket on wheels for the transport of goods, and at very little expense a pipe could be laid from the road to supply drinking-water from a water-cart. The drainage should consist of two cesspools ready dug, one for slop water, the other for the infected sewage; the earth excavated should be kept dry and available for earth-closets.

On these sites should be erected the portable rooms when required. Should any kindly landowner wish to provide a site for his own particular district, in addition to the public one, he shall be allowed to do so on fulfilling the above conditions, and be supplied with the portable wards, on the understanding that his site becomes, *pro tem.*, the official centre of fever for that area, and that all cases in that area may be brought into it during that outbreak. By this means the whole district would have, as it were, skeleton camps arranged, and all provision made for invasion of disease, costing a mere trifle when unoccupied, and capable of almost unlimited expansion.

In case of a very severe outbreak, the medical officer of health can requisition the wards from other districts.

The Wards.—These should be bright, warm or cool, with non-absorbent walls, capable of frequent changes of air without draught. No better material is to be met with than that made by the Patent Wire-wove Waterproof Roofing Company, a strong wire-wove material, waterproof, tough, giving, when painted, a smooth glazed surface, most easily cleansed and disinfected, and a good non-conductor of heat.

The walls and roof should be double, with air space between, and the system of ventilating by Tobin tubes freely introduced. If the air can be frequently changed without inconveniencing the patient, there is not the same necessity for so large a cubic space per patient.

The question of a room being too hot or too cold depends in a great measure upon its scientific construction, and the material of which it is made. Ice keeps better in lead than iron; a blanket would keep a can of water hotter, and a lump of ice longer, than if either were placed in a brick cupboard; and even paper blankets are warm, or, to speak more correctly, retain the body heat. Hence, if you can find a good non-conductor of heat, however thin it may be, and construct the room with double walls and roof, with air-space between, it would be possible for the temperature of that room to be very little affected by the outside temperature. Such a room could be kept warm by stoves in winter, and ought not to be baked by sun in the summer. A brick room exposed to the baking sun takes all the night to cool, whereas a thinner material would soon radiate the little heat it held.

In the Local Government Report, in speaking of temporary hospitals, cases are mentioned of patients dying of cold, and of water freezing in rooms; the latter sometimes happens in well-built private houses; but if it does it must be somebody's fault; bad construction of room, insufficient warming apparatus, or inattention to fires. Nor, again, need these portable buildings be heavy; a little science helps one in the construction, and a determination not always to build in the same groove.

I built a hospital that weighed only 13 cwt., 16 ft. by 12 ft.; three or four navvies had smallpox in it in one of the most exposed spots in Kent. I erected it myself in a storm of snow and hail about five years ago. Before it was erected on the spot one of the largest London builders sent his foreman to see it, who rather laughed at the slightness of my timbers. He went away and supplied a house, supposed to be like mine, using timbers at least three times as heavy. His house blew down in about a week; mine never did. Unnecessary weight is a great mistake, particularly in a portable hospital. Thick timbers only warp and hold the damp; all you want is strength enough, and that judiciously applied.

These houses of wire-wove material can be constructed for about 6s. per square foot of floor, calculated to last for twenty years, at the cost of painting once in four. One, say 24 ft. by 12 ft., could be erected in about twelve hours. There is not, as a rule, such a desperate hurry; a doctor is cautious in pronouncing as to *the first* case of fever, and after the announcement there is always a certain amount of unavoidable delay before action can be taken.

It might be wise to engage one skilled nurse for the union; but this is not absolutely necessary. No difficulty has hitherto been experienced in procuring fever nurses when required. Moreover, in country districts, months of idleness and making gossiping acquaintances would be undesirable. A nurse in thorough training, and one who knows nobody, is always the most efficient.

We come now to the relative cost. I take an estimate for a central hospital, say 2,500*l.* for twelve beds, because these figures have actually come before me, and are probably as moderate as possible, representing in the particular instance about 6d. per cubic foot. This figure included no water supply or purchase of site.

Hospital for union, consisting of three relieving officers' districts, to hold twelve beds	£2,500
	£2,500
(*About* 208*l. per bed.*)	
Six portable hospitals for same district (two for each district) about 70*l.* each.	£420
Two extra ditto, 70*l.* each	140
(These hospitals, holding three beds each, would make up twenty-four beds.)	
Three houses for nurses	75
Preparing three sites, say 20*l.* each	60
	£695

Say 800*l.* for twenty-four beds; about 33*l. per bed*, or *one-sixth of cost* as compared with central hospital.

In my next remarks, I hope I shall not be misunderstood to be wishing to impose on my medical friends any additional gratuitous work. There is no profession in the world the members of which give up so ungrudgingly so much valuable time and energy to alleviate the ills of mankind as the medical profession in England, or on the Continent, or in the civilised world.

I am treating the matter purely as a business question; and I am only endeavouring to provide local hospitals where patients can be treated far better than in their own homes. I am also assuming that most doctors would rather keep their own patients than send them away to a distance where they could not possibly find time to visit them.

Central hospitals are attended either by a resident medical officer or else by some local practitioner, who for a fixed sum, say 10*l.* or 20*l.* per annum, and 1*l.* per case, undertakes the charge of the hospital.

In the local hospital system there would be *no medical fees or charge for drugs whatever.* Patients would be of three kinds: those treated by their own doctors privately; those on clubs; those under the parish doctor. Hence, fever cases would be only a part of the duties of the medical men working in the district, and nothing could be charged to the ratepayers.

For argument's sake, assume the moderate number of fifty cases: under the central system there would be a charge on the lowest estimate of 60*l.* per annum, under the local system nothing.

This amount saved per annum would alone in twenty years renew the whole of the portable hospital wards, and leave 400*l.* to the good.

People say that if there is so much difficulty in providing one site, so much greater will be the difficulty to provide many. On the contrary, I believe the smaller you make your area, the less will the opposition become. We do not mind nursing our own children in our own houses, but we should strongly object to having the children of others thrust in upon us. The ills of our neighbours, even from selfish motives, we are glad to endeavour to alleviate, and for them we might even run risks; but we are not called upon to do this for people living at a distance, just because their own neighbours will not look after them and provide the needful accommodation.

The discussion upon the foregoing group of three papers was opened by

Dr. Fosbrooke, Medical Officer of Health, Worcestershire County Council, who said that the Worcester County Council directed the administration of three permanent and three temporary hospitals. His experience was that the latter were no more unsafe than the former. A fever hospital, like a fire-engine, in order to be efficient for its purpose, must always be kept ready for instant use. It must be ready to receive the very first case of contagious disease that broke out. The reader of the last paper spoke of permanent hospitals as if they were always inaccessible. It was not uncommon, in his experience, for patients to go eight or nine miles to an isolation hospital, and he had never known of a case of injury arising in passing through towns and villages, or where the journey had caused the patients to suffer. He could not agree with Mr. Few that temporary hospitals would be more popular than permanent ones. Parents would readily enough send their children to a hospital where they were assured that the child would be better treated and receive more care than at home. The children also were very glad to go. There need be no delay in removing patients; it was only necessary to telegraph when a case broke out, and an ambulance was sent at once. At Droitwich they were going to do away with the temporary hospital in favour of a permanent one.

Dr. Nasmyth (Sanitary Association of Scotland) said he wanted to organise in his part of Scotland (Fifeshire) a combination hospital, in which the principles of the cottage hospital and the isolation hospital could be conveniently combined. He would like to ask Dr. Thorne if he saw any objection to such a combination. He wished to know also what distance he would consider safe for the removal of cases.

Mr. Jeaffreson (Framlingham, Suffolk) described the arrangements in practice at an isolation hospital at Framlingham, which had been formerly always known as the "Pest-house." It was very seldom they had a case, but they were always prepared, because they gave to the nurse a retaining fee in the shape of a garden and rooms rent-free. They had also a permanent hospital, but the only difference between them was that in the permanent hospital beds were kept ready for patients, but in the pest-house there were no beds. Every fresh case required fresh beds, which would be taken away when the patient had gone and destroyed. When the pest-house had no patients it was absolutely empty. In rural districts such hospitals might be empty for years. A double treatment of that kind was the best practical solution of the problem. The nurse's fee would be paid by the parish when it was a parish case, and by the friends of the patients when it was a private case.

Mr. T. F. Wakefield (Chairman of the Health Committee of the Corporation of Richmond) said

Richmond was still seeking a site for an isolation hospital. Several eligible sites had been offered, and would have been bought, but in every case the neighbouring residents protested against the hospital being built. The County Council was about to apply to Parliament for power to deal with the whole county in regard to provision of this kind. In Surrey only one-third of the population was supplied with isolation hospital accommodation. The County Council had interested itself in trying to solve the question whether some danger of infection did not arise from the use of the ambulance itself. Finding that the bearers and attendants were themselves not attacked by infection, they had come to the conclusion that the fear of infection from the use of ambulances was not justified. The supposed difficulty in getting patients to a hospital was chimerical. With a proper ambulance it was as easy to go ten miles as to go one. The speaker, in conclusion, called attention to what he said was an excellent brougham ambulance, which could be seen in Long-acre, at Davis's, the coach-builder's. Other County Councils would find it necessary to do as Surrey was doing, and they would do well to obtain powers from the legislature to deal with the question on a comprehensive plan. The best solution of the question was, in his opinion, a permanent central hospital.

Alderman Ernest Day (architect, Worcester) said he once held the same opinion as Mr. Few, but further experience with temporary hospitals had brought him to an opposite opinion. The prejudice against living near a permanent hospital was dying out, and people were found now ready to build right up to the walls of a hospital. The objections he had against Mr. Few's interesting paper were economical ones. On the score of economy, one central institution was far better than half-a-dozen temporary ones. Each would want a doctor, making six doctors instead of one. Two or three nurses might be sufficient for a permanent hospital, but six temporary hospitals would require six times as many. The materials and all the apparatus, as well as the staff, would have to be multiplied by six, and the sites, however temporary, would be very costly. A temporary building would require to be renewed every twenty years, but a permanent hospital might last for a century.

Dr. J. Maxwell Ross (Officer of Health, Dumfriesshire) said he had been disposed to recommend six hospitals, viz., one for each of the six districts in his county, instead of one central hospital, and the present discussion would help him to mature his views on a question in which he was greatly interested.

Mr. Wakefield begged to be allowed to add to his former remarks that, in his opinion, no hospital should be considered complete without a complete apparatus for disinfecting by superheated steam. The expense would be prohibitory if such apparatus had to be multiplied in proportion to the number of temporary hospitals that would be necessary.

Councillor John Atha (Leeds) said they had formerly found it difficult to dispose of the families of persons removed from their homes suffering from infectious diseases during the period necessary for disinfecting their houses. They had now adopted the expedient of providing a sanatorium, where the families of infected patients were sheltered and maintained until the doctor was satisfied that there was no danger to be apprehended from allowing them to return home. At first, the County Council exacted payment for the accommodation, but eventually they had decided that the public should bear the whole cost, since it was primarily for the sake of the public health that these people were forced to leave their homes temporarily. It was still a moot question with them whether it was not more economical to put up wooden buildings, which could be burned down when no longer wanted, or to build more permanent structures.

Dr. Thorne-Thorne, in replying, said he was so much in sympathy with Mr. Few in principle that he was sorry to have to differ from him *in toto* with respect to method. His plan of multiplying temporary hospitals would be a most expensive one, and it would probably be found that when everything necessary had been supplied to his temporary hospitals, ten times the estimated cost would be incurred. Dr. Fosbrooke had always been a difficulty in the way of the advocates of permanent hospitals, because his establishment seemed to be so successful, and was so well conducted as almost to amount to a refutation of their arguments. Now that even Dr. Fosbrooke admitted failure, the question was settled. If wood were used in the construction of temporary hospitals they should be burned down; but they never were. The wooden buildings were left to rot on the ground, and he could show samples of wood from such structures which would horrify any sanitarian. A proper ambulance would be an excellent thing. It should be of simple construction, and should only require two movements in order to load and unload the patient,—one push to get him in, and one pull to get him out. To properly warm wooden hospitals was very difficult. He had in mind such a hospital where, although they had killed two patients with the heat, they could not, even with roaring fires, prevent water from freezing at the bedsides of the patients. They must have thick walls if they were to keep out the cold in winter. In summer there was nothing like tent treatment. Permanent hospitals ought to be solid buildings, well constructed, and attractive.

The Rev. Mr. Few, in his reply, said he was satisfied to have been able to bring his scheme forward. No one had been able to dispute his main facts. Before a sound conclusion could be arrived at, the question would require mature discussion by the public. With regard to sites, they could often be arranged for in advance, to be only actually purchased on a future emergency. He had found that plan practicable in his own parish. Richmond was a town where the distances were small, and certainly a central hospital was best in such cases.

Mr. Wakefield pressed for a resolution to be submitted to the section in favour of the Surrey plan, the terms of which he proposed to draw up.

Mr. Richard Weaver and Dr. Thorne-Thorne entered in the meantime into a discussion somewhat foreign to the subject. The question was as to how much faith was to be placed in statements made in favour of a nostrum with a hybrid name, advocated by the former speaker, but entirely repudiated by the latter. The authority of Dr. Klein having been invoked in favour of the nostrum, Dr. Thorne said that Dr. Klein was entirely on his side.

Mr. T. F. Wakefield then proposed the following resolution:—

"That in the opinion of this meeting, it is desirable that the Legislature should give power to County Councils to erect, acquire, and maintain isolation hospitals and ambulance stations in the interests of the County as a whole."

Dr. Sykes suggested that the resolution should be referred to Section IX. (State Hygiene).

The Rev. Mr. Few thought that as the resolution was a very debatable one it should not be put.

The Chairman (Sir Arthur Blomfield) intervening, said, leaving aside the question whether the resolution was in order, the discussion of it would take up far too much time. He agreed with Dr. Sykes that such a resolution could be more fitly discussed in the section of State Hygiene, and he would appeal to Mr. Wakefield to withdraw it.

This request having been declined, and the resolution having been seconded by Mr. Alderman Day (Worcester),

Dr. Sykes moved as an amendment,

"That the question be referred for consideration to the section of State Hygiene."

This was seconded and carried, and the discussion on this group of papers came to an end.

The Arrangement and Construction of Asylums for the Insane.

Two papers were devoted to this subject, the first by Dr. Richard Greene, F.R.C.P.Ed., Medical Superintendent, Berry Wood Asylum, Northampton; and the second by Mr. G. T. Hine, F.R.I.B.A., Nottingham.

DR. GREENE'S PAPER.

If it be desirable that the greatest care and judgment be brought into action in the construction of all large buildings, it is imperative that asylums for the insane should be above the suspicion of fault. Here large numbers of patients are kept in confinement. They have had no choice in selecting their place of residence, and no voice in fixing the duration of their stay. They are suffering from one of the greatest, perhaps *the* greatest, affliction that can befall a human being, and common justice requires that their terrible calamity should not be increased by unhealthy surroundings; but, on the contrary, that all the aids of hygienic and other sciences should be called in to lighten their burden and promote their cure.

It is sad to think of the condition of the insane in olden times. Suitable provision was not even dreamt of. Old prisons, monasteries, or, in fact, any building not good enough for anything else, was the lazar-house into which the poor lunatic was consigned. Indeed, it was not until the dawn of this century that the subject was seriously contemplated with a view to reform, and by far the greatest strides have been made during the present reign,—the Victorian era,—which has to be credited with so much that is good in all departments of our civil life.

It may be said that the old asylums were simply a conglomeration of buildings, without attempt at harmony, architectural effect, or hygienic conditions. Few examples of these exist in England at the present day, but in some Continental countries they are common enough yet. During the early part of this century an Act was passed which rendered the building of county asylums, and of making adequate provision for the insane poor, incumbent on the various Quarter Sessions throughout England. It is impossible to refrain from stating that this duty was in most instances admirably performed by the county magistrates, and the modern English county asylum is an institution which is in all countries looked on as a model, both as regards construction and system of management. The visitor who for the first time inspects some of our provincial asylums will be struck with the beautiful sites which have been selected for them, with their carefully laid-out grounds and recreation wards; their comfortable, almost luxurious, appearance, and with the freedom which the patients almost universally enjoy.

The only building to which a modern county asylum can be compared is a general infirmary, and even here there are many points of difference. These points are more noticeable on an internal inspection than on an outside view, and they are caused by the different objects which have to be kept in sight when the buildings are being designed. A very good hospital might prove an indifferent or even bad asylum, and a good and well-planned asylum would be a second-rate hospital. The grand distinction between the two is that in the hospital the majority of patients are in bed during both day and night, whereas in asylums the majority are up by day. Also, an infirmary does not require single-bedded rooms, while in an asylum at least one-fourth of the numbers should be accommodated in rooms having only one bed. These conditions render the designing of an asylum a much more complicated work than that of an hospital.

The site of an asylum should be carefully selected, and a gravel soil obtained, if possible; but inasmuch as an asylum should occupy a position somewhat centrally disposed to the population from which it draws its patients, it is evident that the desirable soil cannot always be obtained, at least it cannot always be had at a reasonable price. When, therefore, the building has to stand on clay, the most careful and thorough subsoil drainage must be carried out.

Some authors have described a variety of insanity as "phthisical insanity." Whether it is perfectly correct to so describe it I am not at all sure; but it is certain that the insane suffer from tubercle more frequently than the population generally; and as it has been proved that sub-soil drainage lessens the mortality from consumption, the point needs no further argument to enforce it. The group of diseases coming under the name of rheumatism are also greatly modified by the nature of the soil.

In England it is important to avail ourselves of every gleam of sunshine vouchsafed to us. A southern aspect should, therefore, be insisted on, and the building should be placed on gently rising ground not too high above the sea-level, as exposed sites are apt to be cold during the winter months for an invalid's residence.

The amount of land should be sufficient to protect the patients from the gaze of the inquisitive; but a large estate is neither desirable nor necessary. High roads and public footpaths should be at some little distance.

[*Continued on page* 189.]

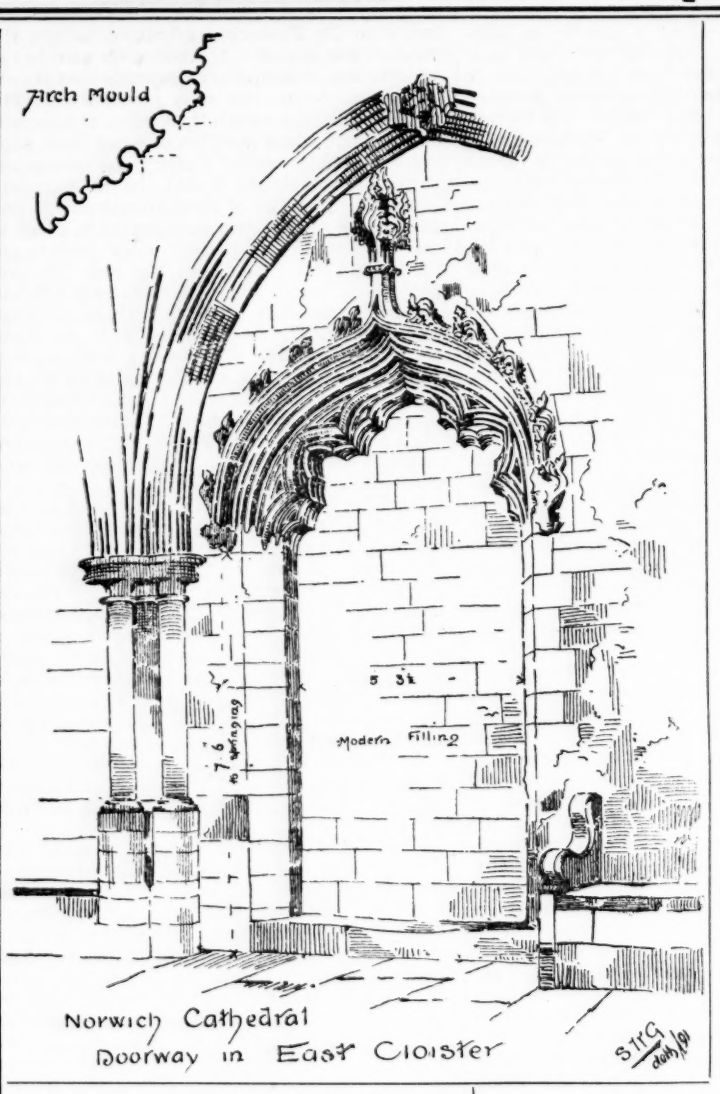
Illustrations.

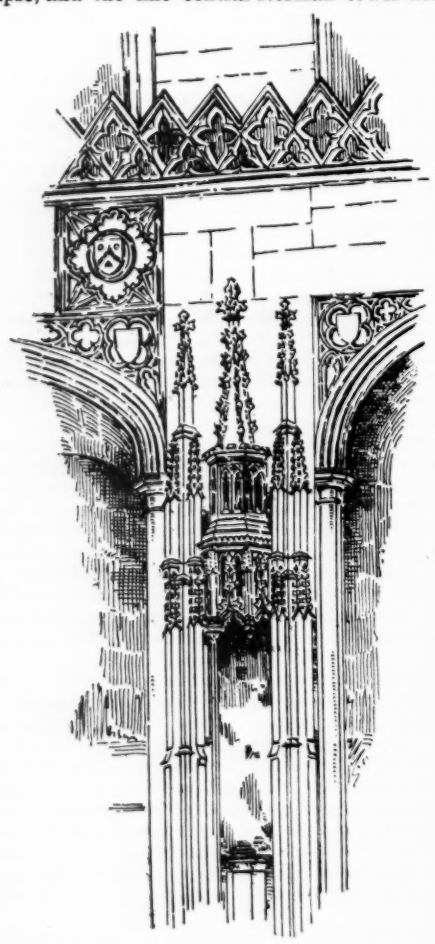
NORWICH CATHEDRAL.*

THE history of the present fabric commences with the removal of the see from Thetford to Norwich in 1074 by Herbert de Losing, or Losinga. The foundation deed was signed in 1101, so that the cathedral must have advanced to some considerable extent by that period. Bishop Herbert is said to have erected the presbytery, choir, and transepts, and no doubt prepared a suitable base for the great central tower, which, as it appears now, however, was not built until a later period. The great western arm of the cross was built by Herbert's successor, Eborard or Everard, in the early part of the twelfth century.

The church, as completed at that time, is almost entirely in existence, so far as its ground plan is concerned, at the present day; and Norwich, of the three great foundations of the Eastern counties, is the most complete as a specimen of the architecture of the Norman period. The extent of this early work will be at once apparent by reference to the ground plan given by us, which has been taken from an unpublished one made by A. D. Repton at the beginning of the present century, and has been kindly placed at our disposal by the Society of Antiquaries. The cathedral at the present time is correctly represented by Repton's plan, with the exception of the Slype, or passage between the south transept of the church and the chapter-house, which exists no longer. Some additional information has also been added, and the plan brought up to date.

Norwich Cathedral, like Peterborough, lies in a hollow, not, however, like the latter, from the absence of higher ground. It does not, therefore, show to advantage except when approached from the river on the east side. Here the solid Norman chapels flanking the apse, and the fine central Norman tower with its later spire, contrast finely with the richer and lighter clearstory, the large windows of which have reduced the wall space to a minimum, and necessitated the use of flying buttresses to resist the thrust of the vault. The other portions of the exterior are not so well grouped, and the great length of the nave is, like St. Albans, rather remarkable for its dimensions than for its picturesque effect. The west front, too, has not been improved by the later additions made to the Norman work, and is an example of an unhappy bit of design handed down to us from mediæval times.





It is, however, when we reach the interior that the full extent of the impressiveness of Norwich is seen. Standing at the west end we have a magnificent range of Norman arcading,—eleven bays to the rood-screen, fourteen to the tower,—crowned by an elaborate vault of Perpendicular date, which has taken the place of the flat Norman ceiling. The vista is broken by the rood-screen and its organ, giving value to the effect of the interior without entirely hiding the vaulting of the presbytery, and the apsidal termination lighted above by the delicate tracery of the windows already referred to. The whole of the interior effect is wonderfully enhanced by the suitable subdivision and screening of the several parts, giving an air of mystery which is so sadly wanting in some of our cathedrals, where the whole length of the building, from the west end to the altar, can be seen at a glance.

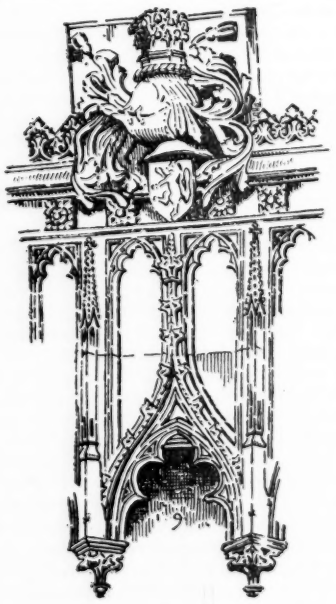
The ritual choir extends two bays into the nave, and the stalls,—fine specimens of fifteenth-century wood-carving,—are ranged on either side against the arches, and are continued eastward under the central tower. Only those, however, in the nave retain their canopies.

At the present time the portions of the cathedral immediately north and south,—including the transepts,—are in a condition which tends to detract from the proper effect of the interior. The north transept is occupied by a series of pews with a screen across about midway, and the arrangement of the pews in the south transept leaves much to be desired. These portions of the building are blocked up to a much larger extent than is compatible with the satisfactory effect of the interior, and it would be better if a clean sweep were made of these excrescences.

The presbytery has within the last few years undergone a change. The level has been considerably lowered to show the bases of the columns, and the sanctuary is now raised two steps only above the choir instead of six, as is shown in Repton's and Britton's plans. This has been corrected on the plan which we publish to-day, and also the new position of the altar, which has been brought back into the chord of the apse. Behind, in the wall between the two easternmost columns of the apse, were discovered the remains of the ancient Norman Bishop's chair, which was approached from the presbytery by a flight of steps. On either side are stone seats for the clergy in attendance on the Bishop, as was usual in churches of the early basilican type.

Around the ambulatory was a series of chapels. Two Norman ones still remain flanking the great apse, as at Gloucester; a chapel dedicated to the Virgin, erected eastward by Bishop Suffield in the thirteenth century, but since destroyed; and three chapels, two on the north and one on the south, occupied the space immediately on either side of the presbytery. Only one of these, founded by one Bauchon (since corrupted into Beauchamp) in the fourteenth century, remains on the south side, with an elaborate vault, similar to those in the presbytery and nave, added in the fifteenth century. Another chapel projects eastward from the southernmost bay of the south transept, apparently of thirteenth-century date. The lower part is now used as a vestry, and on the spot once occupied by the apsidal Norman chapel north of it is a building now devoted to the Diocesan Registry and other offices.

The monuments in the cathedral are comparatively uninteresting, and the detail is not by any means, in most cases, of that refinement which we are accustomed to see



* We may mention that this series of illustrations of the Cathedrals of England and Wales commenced with Canterbury, which appeared in the *Builder* for January 3 last. Since that date, the following Cathedrals have been illustrated, viz., Lichfield, in the number for February 7; St. Albans (before the alterations of recent years), March 7; Peterborough, April 4; Wells, May 2; Exeter, June 6; Salisbury, July 4; and Bristol, August 1. The tenth of the series, viz., Rochester, will appear in the *Builder* for October 3 next.

in Mediæval work of this class. Bishop Goldwell's effigy is, however, an interesting one, and has a good example of a shield with helmet and mantlings over the centre of the canopy. There is a good deal of later panelling in the presbytery, which covers the earlier work; and two other bays on the south side, east of Bishop Goldwell's monument, were used for sepulchral purposes. The founder's slab, inserted in the seventeenth century, still remains in front of the high altar. In the nave are a few monuments. One to Sir Thomas Windham which, after having been removed to the Jesus Chapel from the Lady Chapel, has now once again been shifted, and occupies one of the arches of the north arcade, immediately opposite the door to the west door of the cloisters. In the south arcade are two canopied monuments to Bishop Nix (the builder of the vaulting of the transepts), and to Chancellor Spencer, and the simple Norman cross barrel vault of the aisle has been here panelled over. In the bay east of this is a curious late monument to Bishop Parkhurst, and a fine heraldic panel has been fitted into the columns of one of the piers on the north, immediately east of the tomb of Sir James Hobart, which was once enriched by a brass.

South of the cathedral, and approached by two doorways from the south aisle of the nave, are the cloisters, erected during the fourteenth and fifteenth centuries, and forming a magnificent quadrangle of about 180 ft. square. The buildings which surrounded them have all disappeared, with the exception of a fragment of the Strangers' Hall, and a room at the north-west angle, formerly the locutory, and now used as a schoolroom for the choristers. There is in this latter some bold Norman work, but the western wall is later, and has been, with some other portions of the exterior, restored. The Bishop's Palace is on the north side, and has remains of an interesting gateway, and there are also on the west side of the Close two interesting gateways,—one of the fourteenth, the other of the fifteenth century,—which are remarkable for the delicate flint panelling so common in Norfolk, and for their sculptural decoration.

Our view of the Cathedral is taken from the roof of the south cloister, the long flank view of the building being treated in elevation, a treatment unavoidable where, as in this case, the standpoint is halfway between the two extremities of the building. This gives, perhaps, a rather conventional effect to the drawing, but it has the advantage of giving a very comprehensive view of the architectural design, from a point from which it is not often seen. The drawing is by Mr. S. K. Greenslade, who also kindly supplied the sketches of some details which accompany this description of the Cathedral.

UPPINGHAM SCHOOL LIBRARY.

THE new school-house and class-rooms at Uppingham, lately finished from Mr. Jackson's designs, have left the old school-house free for other purposes. It is an interesting building, going back nearly, if not quite, to the foundation of the school at the end of the sixteenth century. Originally a hospital for almsmen, it was turned, in later times, into a head-master's house, and received several additions during the occupation of the late head-master, Mr. Thring. Repeated structural changes within and without, combined with original defects of construction, had made the walls and roof so insecure that when it was decided to convert the building into a school library, it was found necessary to rebuild a considerable part of it. This has been done with care under Mr. Jackson's direction, every old stone being replaced, so that it is not easy now to believe that the walls have been taken down and reset. A new roof of timber, with coved plaster ceilings decorated with moulded ornamentation, runs from end to end of the library, and the room will be handsomely furnished with oak, and form a picturesque as well as a convenient addition to the school buildings.

Besides the Library, which is 74 ft. long and 21 ft. wide, the building contains a masters' common room, residences for librarian and caretaker, and four class-rooms. Messrs. Parnell & Son, of Rugby were the builders in this case, as well as in that of the new school buildings, and Mr. R. Evans has acted as clerk of works.

The drawing from which the illustration is taken was exhibited in the Royal Academy of this year. As it has been published in another journal, we may say that we have Mr. Jackson's authority to state that it was intended for and addressed to the office of the *Builder* for illustration, but was left by his messenger at another office.

DESIGN SUBMITTED FOR THE SHEFFIELD MUNICIPAL BUILDINGS.

A LITTLE more than a year ago, viz., in our number for July 5, 1890, we published a perspective view and two plans of the design submitted by Mr. H. T. Hare in the second competition for the Sheffield Municipal Buildings.

We now give an enlarged view of one corner of Mr. Hare's design, from a drawing hung in this year's exhibition of the Royal Academy.

SEVENTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

(Continued from page 187, *ante*.)

In many districts stone is to be had cheap for building purposes, and in these cases it will most likely be used for asylum construction; but perhaps the majority of our asylums are built of brick. We have outlived the time when "Capability" Brown said that "a red brick house puts the whole valley in a fever"; and when Repton called a brick house "a scarlet sin against good taste." Our views have changed for the better since 1773, when Brown died, and we now think that a well-designed brick house improves a landscape, especially if it be made of the beautiful plum-coloured bricks common in Queen Anne's time; but not so easily obtainable now. Whether brick or stone be employed, the quality should be of the best. Porosity, or a tendency to scale or crumble, should be guarded against, or the wall will prove damp. In some counties it is the custom to have the outer walls made with an air space of two or three inches. This not only prevents the damp from penetrating, but it has a tendency to equalise the temperature of the ward. Perforated bricks make a wall which is at once strong, light, and dry. One important point, frequently overlooked, is the quality of the mortar. It rarely contains sufficient lime. In Norway and Sweden the winter months are preferred for building operations, but the quantity of lime used is double that of English builders.

Slates are almost invariably used for roofing. Tiles are, however, warmer and more picturesque, but they are not so durable, and in places not readily accessible by the sun's rays they frequently absorb much moisture, and, after a severe frost, become so soft that they are useless.

The inner walls should be plastered throughout, or, preferably, covered with Portland or parian cement. It is not on æsthetic grounds only that I insist on this, but for sanitary reasons also. The joints of brickwork can never be made perfectly smooth. Dust collects in the grooves and irregularities, and dust too often means disease. A skirting-board implies that there is a space at its back for collecting dust and dirt, and for affording a pleasant playground for rats and mice. It should be abolished, and a strip of wood about 2 in. wide and 1 in. thick nailed to the floor close to the wall.

The space between the foundation walls should be filled in, and a thick layer of concrete should rise to within $1\frac{1}{2}$ in. of the floor level. On this concrete, wood blocks should be laid, a thick layer of Stockholm tar being placed next the concrete. By these means neither damp, sewer-gas, nor vermin can get under the floor. It is also warm and the tread is noiseless,—important points in asylums and hospitals.

The favourite kind of window at present is the ordinary double-hung sash-window. Why it should be the favourite is not easy to see.

In asylums it has to be blocked both top and bottom, merely allowing an opening of about 4 in. or 5 in. The consequence is that the amount of air admitted is insufficient in warm weather. Further, it is most difficult to keep clean. Dirt accumulates between the sash and the frame, and the cords are constantly breaking. A modification of the French casement is much to be preferred. The upper part should be an oblong swivel, or hinged fanlight, and the lower divided at its centre by a strong mullion, the sections being fitted with sashes moving on central pivots. An asylum needs abundance of light, and the windows should be more numerous, perhaps, than in any other building. Unfortunately, the amount of glass necessary for light is apt to make the wards somewhat cold in winter. It would be very desirable to have all the windows double, and in this case the inner window might be on the double-hung sash principle. No blocks would be necessary, and ventilation, without draught, would be easily maintained. Wherever practicable the windows should be placed opposite to each other, and the width of the room should rarely exceed 25 feet, or perflation is likely to be imperfect. The upper panels of the doors should be, almost without exception, of strong plate-glass, and the lower panels of open ironwork, fitted in some cases with light wooden shutters.

The staircases are almost invariably of stone. In most asylums they are too narrow, and the risers too high.

In designing any building the first principle is, that it be perfectly adapted for the purpose in view; and no flight of genius on the part of the constructor can justify his swerving for a moment from that principle. If the edifice can be made beautiful, so much the better; but beauty must be made subservient to utility and hygiene. It is often justifiable to decorate construction, but hardly ever to construct decoration. What then is the best design for an asylum for the insane? The old conglomerate style is gone for ever, and the linear is fast following it. Nevertheless, there is something to be said in favour of the latter, especially if the word "linear' be not too literally interpreted, and the less important wards placed in *échelon*. It is, however, not very suitable for asylums exceeding 300 beds. Nowadays the block system in one of its many forms is that which is almost invariably followed in the construction of asylums of 500 beds and upwards. There are five chief ways in which the blocks may be arranged.

1. The blocks are placed on either side of a straight corridor of communication. This does not look well in elevation, and it covers much ground, but it is a simple form of construction, and might be found really good from a hygienic point of view, because the circulation of air would be free, and the drainage easily arranged.

2. There is the broad arrow form. Here the straight corridor is, if I may venture to say so, bent at its centre, and the blocks arranged in *échelon*. I am inclined to think that this plan is better adapted for an hospital than for an asylum. The difficulty of supervision must be great,—at least, in large asylums.

3. We have the corridors arranged in the form of the letter H, the blocks being attached to the free sides of the letter. In my opinion, this is an objectionable form.

4. The blocks are arranged in quadrangles, or rather parallelograms; the important blocks facing due south, and the other blocks having their ends south and their sides east or west; the administration portion of the asylum only being to the north. Several asylums have lately been built on this principle, and for compactness and facility of supervision it is unrivalled.

5. We have the horseshoe form of corridor, with the blocks placed all round the outer edge. It is probable that this principle will ultimately be developed into the best plan of all.

A detached hospital for infectious disease should form part of every asylum.

The height of a building will profoundly affect its hygienic qualities, because the higher it is made the greater will be the interference with the circulation of air around the ground-floors, the greater will be the difficulty in lighting and ventilating the corridors of communication, and in securing perfect sanitary arrangements throughout. I have, therefore, no hesitation in stating that an asylum should never exceed two stories in height, and, if any part of an asylum be three stories in height, the whole building may be described as faulty and unsuitable. Apart from the sanitary aspect of the question, there are reasons why no part of the building should be three stories, but these objections are scarcely relevant here. I should, however, like to go further and affirm my conviction that a one-story building would be by far the best, whether viewed from a point of management as regards the staff, of comfort as regards the patients, or of ease in carrying out the principles of modern hygiene. Of course, the objection would be at once raised that the amount of land covered by the building would be enormous. My answer to that would be that a one-story building for 500 or 800 patients

would not need more ground-space than one of two stories for 1,000 or 1,600 patients, and many of our public asylums exceed even the latter number. If I say that no asylum should exceed 800 beds, I do not think I shall find my assertion contradicted by any one conversant with the inner working of such institutions.

Whatever form of construction be adopted, the blocks will be so arranged as to lie around, or on either side of, the administrative department, which thus forms the centre, and contains the various offices, including a large recreation hall.

The patients' blocks will be divided into day-rooms and dormitories. The former will vary in size, containing from ten to fifty, or, perhaps, 100 patients; the latter will range from three-bedded rooms to those in which 100 may be placed. The size is somewhat important, as it is always difficult, and sometimes impossible, to provide efficient cross-ventilation in small dormitories. Probably those containing between twenty and thirty beds will be found the best. As I have already said, about one-fourth of the dormitory space should be in single-bedded rooms.

As regards the cubic space allowed per patient in a county asylum, it is in all 1,080 cubic ft., 600 being allotted to dormitory and 480 to day-rooms. The superficial space is 50 ft. for the former and 40 ft. for the latter. It follows, therefore, that the rooms are usually 12 ft. high. This total of 1,080 cubic ft. is by no means excessive; but it may be sufficient, provided the air is very frequently renewed. As each individual renders impure between 2,000 and 3,000 ft. of air every hour, it follows that the air in asylum dormitories must be renewed from four to five times every hour, and this renewal of air is one of the most difficult problems with which the medical superintendent has to deal. In summer it can be managed, provided the external air is not perfectly still,—a condition which does not often continue many hours at a time in England; but in winter, when the air is cold and when the low nerve-force of the lunatic has to be considered, the question bristles with difficulties, and I doubt whether any very satisfactory solution of the problem has yet been found. Abundance of open fires would meet the difficulty, but apart from the expense of such a system, it could not be carried out safely in dormitories occupied by the insane. Hot air may be supplied by one of the various slow-combustion stoves, by hot-water or steam-pipes, or by driving hot air into the rooms by means of fans. All these methods, however, provide warm air, and the patient is thus compelled to warm his body with the air he breathes,—a proceeding wholly opposed to both the teachings of nature and to the principles of hygiene. I have elsewhere admitted that this artificial way of warming dormitories and day-rooms is often the least of two evils; but it must not be pushed; must be carefully watched, or a high death-rate from consumption may be expected. The fan system possesses one advantage over the others, namely, that in warm weather pure, cold air may be driven in, and thus other means of ventilation may be supplemented. The most usually employed of these are Tobin's tubes, Arnott's valves, extraction flues running alongside the smoke flues,—other extraction flues are gathered into a turret, and in this turret gas-jets are kept burning; sun-burners or Wenham lamps; Boyle's extractors, &c. There is, however, nothing special in the ventilation of an asylum.

The same may be said concerning the disposal of sewage, and the arrangement of baths and closets. The latter are usually placed in small blocks in the rear of their respective wards. Care should be taken that the connecting passage between the wards and the closets is short,—not exceeding a few feet,—because if it be long there is some danger of it acting as an extraction flue, and by drawing the foul air into the ward increasing the very danger it is intended to prevent. A stove placed in the closet block would obviate this risk. A well-equipped Turkish bath should never be omitted.

The main flue from the furnaces should be carried underground for some distance from the building, and the chimney should rise high enough to carry the smoke well clear of the grounds. It is a good plan to make use of the chimney as a sewer ventilator, and for this purpose a 12-in. pipe should be taken from the highest point of the main drain to the base of the chimney.

Much of the health of the patients will depend on an abundant supply of pure water. It should not be less than 30 gallons daily for each patient.

The electric light has not as yet made much way in asylums. Its gradual introduction is certain, and with the abandonment of gas another element of danger will be banished from the lives of the insane.

As minor points, yet still affecting the health of the patients, are means employed in decoration. The wall coverings should either be cheap enough to admit of frequent renewal, or they should be of some material which will be uninjured by washing.

The floors should not be scrubbed often, as the constant evaporation of water from the floor of a sick-room must be injurious. The boards should be rubbed with beeswax and turpentine.

It will be gathered from what I have said that the hygiene of an asylum closely resembles that of any other large building. It is somewhat more difficult to carry out, but the special points are few, and need little emphasis to impress themselves on the minds of those conversant with the principles of general hygiene.

Dr. Saunders (Medical Superintendent of the Sussex County Asylum, Hayward's Heath) said that in the arrangements of asylums there was nothing more important than the water supply. The water in wells was often rendered useless. If the site was not good the water would often get polluted. The selection of a site was, therefore, also a most important matter.

Mr. Banister Fletcher (Professor of Architecture and Building Construction, King's College) pointed out what seemed a little like a contradictory statement in Dr. Greene's paper. In one part of it, double-sash windows were condemned, while a little further on an opinion was recorded in favour of the double-hung sash principle. He wished to ask Dr. Greene whether the 12-in. pipe for air referred to in the paper was to be connected with the base of the chimney.

Dr. Greene, in reply, said he agreed with Dr. Saunders as to the importance of a site which would afford the chance of a good water supply. In answer to Professor Banister Fletcher, he said double-sash windows were objectionable when blocks had to be used, but when the window itself was double there was no necessity to use blocks. The air-pipe referred to opened into the chimney at the base.

Sir Arthur Blomfield at this point interrupted the proceedings in order to refer to a matter which had come before another Section, and which required to be dealt with at once. On the previous day a resolution had been proposed in the Section of State Hygiene which, in his opinion, more properly belonged to the Architectural Section. It was a question with regard to the education of architects. That section had passed a resolution in favour of the statutory examination and registration of architects. It appeared to him that such a resolution should have been at once referred to that Section.

Dr. Sykes then proposed the following resolution, which was seconded by Mr. Ernest Turner, F.R.I.B.A., and supported by Mr. Rogers Field, C.E.:—

"The members of the Architecture Section desire to consider the resolution adopted by the Section of State Hygiene approving of the statutory examination and registration of architects before the definite adoption of the resolution by the Congress. They are of opinion that this question should have been referred to Section VI., 'Architecture in Relation to Hygiene.'"

The resolution was put and carried unanimously.*

* From a report which is before us of the proceedings in the Section of State Hygiene on the occasion in question, it appears that Mr. Arthur Cates strongly protested against the adoption of such a resolution as the one referred to, in the face of the thorough and decided opposition of the Royal Institute of British Architects,—the only society which could justly claim to be representative of the architectural profession as a whole. Mr. Mark H. Judge also opposed the motion, and moved an amendment considerably altering and limiting the scope of the resolution. This amendment was carried by a large majority. Then, it appears, the Chairman (Dr. Thorne-Thorne) persisted, in spite of protests, in putting the original motion, which he declared carried. This *contretemps* seems to have been largely due to the apathy of members of the Institute. Owing, no doubt, to the protest made by the Section of Architecture, the resolution carried in so curious a manner in the Section of State Hygiene was not included in those which were read out at the final general meeting of the Congress on Monday, the 17th ult.

MR. G. T. HINE'S PAPER.

Asylum construction differs from other branches of architecture in its relation to hygiene in that it demands a consideration of the mental as well as of the physical welfare of the people, and no architect can hope to attain much success in asylum construction who does not devote some study to the nature of the malady and habits of the unfortunate class for whom he provides accommodation.

The old days of prison-like cells, iron fetters, and strait-waistcoats have happily passed away, but still there is much to be done by way of improvement; and an architect may assist materially in lessening the troubles and contributing to the cure of these poor people by the care and consideration he gives in providing them with bright and healthful homes, from which the idea of detention is as far as possible removed. Unfortunately he has too often to contend with the objection that asylums are provided out of the county rate, and that his duty to the ratepayer demands that cost should be a first consideration. Unlike the hospital, where only physical disorders are treated, and a simpler form of construction is required, the lunatic asylum has not the pecuniary support, and therefore, to a less extent, the sympathy of the public; and too frequently an architect's first instruction is, that the cost per bed must not exceed a figure which is more applicable to the workhouse than to the hospital.

But in these days of progress, it is coming to be understood that we can do better service to the ratepayer by giving first consideration to other points than that of mere cost, and that in providing buildings skilfully designed and well constructed, we afford the best opportunities for successful treatment and speedy cure, and thus are studying the truest economy.

In the short time allowed me for this paper, I must restrict the interpretation of my theme to its narrowest limits, and regard the asylum as meaning only the pauper institution, and not the hospital for private patients. The first principles, however, of arrangement and construction are more or less observable in all forms of homes for the insane, and if we allow a somewhat more luxurious development in the private asylum, we might fairly apply the following observations all round.

Before touching upon the construction of asylums, I ought to say a few words on the selection of a site, though unfortunately it rarely comes within an architect's province to advise about this; generally the site is purchased before the architect is called in to design or compete for the erection of the building.

A word in passing about competitions, which are unfortunately gaining ground,—I say unfortunately, because they are not always calculated to produce the best results. Too much importance is attached to the mere design, without regard to the details of construction, or the practical experience of the author; and it not unfrequently happens that a good workable plan has to be sacrificed to the symmetrical outline, necessary to make it attractive *on paper* and give the author a chance of success.

A site should, in my opinion, be, firstly, on high ground. I believe, in a mentally hygienic sense, much depends on elevation. It is a known fact that in some parts of the world the intellectual standard is lower in the lowlands than in adjacent higher districts; and I should much like to see some statistics of cures effected in asylums on elevated situations, as compared with others on lower ground. Secondly, the soil should be dry, and sufficiently porous to allow of the sewage being used on the land; and, thirdly, an abundant supply of good water should be available.

If the site is on a slope, it should be a southern one, or should allow of the rooms constantly occupied by patients facing the south or south-east. Sunshine is a necessity where the relief of mental depression is aimed at, and care should be exercised in reserving the best aspects for the patients' day-rooms.

In the general arrangement of an asylum, the first question to be determined is the principle on which it should be built. In this country asylums are built either on the "pavilion" principle, where the different blocks are connected together, and communicate with the administrative centre by one-story corridors, or as continuous buildings; the latter being the most common and convenient plan for small asylums. Another form of asylum of recent adoption in America, and on the European continent, is

that of entirely detached blocks, placed more or less distant from the central or main building, comprising a number of villas, in which patients can be very effectually segregated. It is claimed that the curative results are higher in this than in any other form of asylum; but I hope we may have a description of these buildings from some of our distinguished visitors, and I shall confine myself to the principles of construction known and adopted in this country.

When the principle is determined, the first care should be to arrange the wards in the best positions for aspect, light, and air, and all within easy reach of the administrative centre. In small asylums this is a comparatively easy matter, but in buildings accommodating from one to two thousand patients much consideration is required to succeed in all these respects. It is also important that the wards should be arranged so that the medical officers in their rounds may not have to retrace their steps unnecessarily,

The position of the wards is a matter of equal importance; the day-rooms should all, if possible, have a southern aspect,—certainly every ward should have one or more day-rooms to the south; and the blocks should not be built to look out on to one another. In large asylums this almost necessitates a plan on the "*echélon*" principle; and in *very* large buildings even this requires modification, or the length of the corridors would become quite impracticable.

On the classification of patients, and the positions of their various wards, much of the convenience of working depends. In all asylums, unless built for special cases, there should be accommodation for the following:—1, sick and infirm, including a small ward for newly-admitted patients; 2, acute or refractory cases; 3, epileptics; and 4, quiet and working patients.

Some of these wards, again, admit of further sub-division, but the first and second should always be designed to allow of classification by providing two or three day-rooms in a ward, with one or more dormitories on the same floor, in addition to a proper proportion of single rooms.

The infirmary wards, which, including the reception ward, should generally provide accommodation for one-fourth the total number of patients, are best placed nearest to the administrative centre and to the medical officer's rooms, and should not exceed two stories in height; or, if three, the top floor should be devoted to dormitories for quiet patients. Each ward should be self-contained on a floor, and should comprise one or more roomy dormitories, one with a southern aspect for bedridden patients, and with windows on at least two sides to allow of cross-ventilation,—as, indeed, should be the case in *all* dormitories where practicable. The superficial area and cubical contents of these rooms should very much exceed those occupied by healthier patients (the Lunacy Commissioners say one-third more); at least two comfortable day-rooms should be provided for convalescents, one especially for dining in, as these patients rarely go to the general hall for this purpose.

The number of separate single rooms in an asylum is a point about which there is much diversity of opinion, and must to some extent be determined by the character of the patients. Generally, if the dormitories are numerous, and moderate in size, single rooms for one-fifth of the total number of patients will be considered sufficient, but these must be judiciously distributed in something like the following order:—

Acute and refractory cases, one single room to every three patients.
Epileptics, one single room to every five or six patients.
Infirm, one single room to every six or seven patients.
Quiet and working, one single room to every ten patients.

Single rooms should have shutters to the windows, and, except in the infirmaries, where one or two may conveniently be provided with open fireplaces for special cases, no single room should be warmed in this way. It is essential, however, that *every* apartment should be warmed and ventilated with proper inlet and extraction flues, of which more anon.

Doors *without* inspection holes or shutters are, in my opinion, best. In epileptic wards a narrow panel or other clear opening must be left to allow of an attendant hearing a patient when in a fit; but, in other cases, I think inspection holes or shutters suggest espionage, and are therefore undesirable, particularly as it is an easy matter to use a silent lock actuated by the handle, when the door can be opened as easily as a shutter, without disturbing the patient.

But to return to the infirmary. This should have, in addition to the single rooms last named, rooms for attendants in proportion to the number of patients, excluding night attendants, who should be housed in a block by themselves in a quiet quarter; also lavatories, store-rooms, and water-closet annexe, as with all the other wards; and, in addition to these, bath and dressing-rooms. The other patients in asylums of any size will usually bathe in a general bath-house, but infirmary patients should have separate bath-rooms in their wards.

Each ward should also have a scullery, fitted with a small range, washing-up sink, and cupboards for crockery and utensils.

The water-closet annexe in the infirmary, as in all other blocks, should be constructed in a spur, separated from the building by a cross-ventilated passage. It should include closets in the proportion of one to ten or twelve patients, with an additional one for attendants, a small room for slop-sink and brushes, another for dirty linen, a coal place, and, on the male side, urinals. In addition to the general annexe, large dormitories in the infirmary wards should have a water-closet and slop-sink attached, but separated by a cross-ventilated neck or passage.

While on the subject of closet annexes, I will refer to one or two special details of construction, as it will be impossible, in a short paper like this, to speak at length on all such matters. It is assumed that any architect entrusted with the erection of an asylum is well versed in the leading questions of sanitary science.

The walls of all these offices should be faced internally with glazed bricks, or lined with enamelled tiles, which, though costly in construction, are easily washed and kept sweet and clean, and never require an outlay in paint. The floors should be of concrete, tiles, or some equally imperishable material not affected by wet. The doors of water-closets should be low and raised a foot or more from the floor, to allow of observation, and should open outwards. The closet apparatus should be of simple construction, without valve or anything to get out of order. I prefer a hopper-basin, straight down behind, with earthenware trap all in one piece, rather than a "wash-out" basin; a good quick acting cistern with large service-pipe, but *not* with automatic action. Patients should at all times be encouraged in habits of cleanliness and order; and by automatic contrivances, which relieve them of responsibility, it seems to me you frustrate rather than encourage a healthy condition of mind. The objection of an occasional unflushed basin is a trifling matter, and one quickly remedied by the attendant. Urinals are best with only a back and an open channel, without wings or splash pieces; the less surface there is to wash the less chance of smell.

Next to the infirmaries should come either the ward for acute cases or that for epileptics. In a small asylum the latter might be on the ground floor, with a ward for acute cases over; but, in any case, epileptics should, if possible, be housed both day and night on the ground floor. Their wards should be bright and roomy, the day-rooms rectangular, without breaks or obstructions, behind which a patient might get lost sight of while in a fit. There is not the same advantage in subdividing these rooms, as these patients are generally quiet, and, in their healthier moments, are more rational and appreciative of surrounding advantages than other classes of patients. The adjuncts to the ward should be the same as in the infirmaries, but with only one bath in connexion with the dormitory, for cases of emergency. The dormitory should be spacious, and large enough to hold fully five-sixths of the patients in the ward, the remainder sleeping in single rooms, which, unlike other wards, should open out of the dormitory; one or two only opening out of day-rooms for the use of troublesome or invalided patients during the day.

The ward for acute cases may be situated either on the ground floor or on the first floor, if made sound-proof, to prevent the disturbance of patients in rooms above or below. This ward is best broken up by dividing the day-rooms into several smaller rooms by partitions partially glazed, so as to allow of the charge attendant controlling the entire ward. The single rooms, accommodating one-third of the whole number of patients, should open out of the day-rooms. There should be one or more associated dormitories on the same floor for troublesome cases; the remaining patients sleeping on the top floor of the building. In other respects this ward need not differ from the infirmaries already described.

The wards for quiet and working patients, or, as they are generally somewhat erroneously termed, "chronic cases," may be very simple in design and arrangement. Were it possible to construct the entire asylum on this principle,—as are those for imbeciles, and also the London County Asylum at Banstead, which was built to accommodate chronic cases only,—that great desideratum, a cheap asylum, might be more readily obtained. These wards may consist of large day-rooms, with associated dormitories of proportionate size, and a small number of single rooms. The dormitories may all be on the top or two upper floors.

A specially-roomy boot-room, which I have omitted to mention, should also be attached to all wards, for outdoor boots, hats, and cloaks; it should be situated near the outer entrance, with some lavatory basins for patients to wash in when coming from the workshops or off the land.

In addition to the foregoing, it is often convenient to have wards of simple arrangement in connexion with the workshops on the male side, and the laundry on the women's side.

Before leaving the wards, I should add that, whether built on the block or continuous buildings system, they should always be carefully designed with reference to the position of staircases, both for convenience of visiting and for affording means of escape in case of fire. No ward, particularly on the upper floors, should have less than two exits, at opposite ends, making it impossible for any patient to be cut off from escape.

Staircases should be of ample width, and easy of ascent, and always of non-combustible material, for which purpose concrete is better than stone.

It is scarcely necessary to say that floors constructed on a fire-proof principle offer many advantages both against the spread of fire and the conduction of sound, and do not add so much to the cost of a building as is generally supposed. The Lunacy Commissioners require that the ceiling next the roof of all rooms occupied by patients shall be of fireproof construction, and, therefore, in two-story buildings only one more floor remains to be of similar construction to make the building entirely fireproof.

Coal-lifts are sometimes introduced in asylums, but, in my opinion, are better omitted, as being dangerous, and also as robbing patients of work which they can generally well do. Sometimes I provide an outside staircase to a coal-place in the water-closet annexe, the inner and outer doors of which have different keys, thus allowing coal to be brought by men to the women's side without their being able to get into the ward. These staircases also constitute additional ways of escape in case of fire.

The administrative department should be centrally situated between the male and female blocks, and arranged to allow of easy approach to the recreation-hall, kitchen, stores, and laundry buildings from both sides, without the two sexes coming into contact. It should comprise:—

1stly, a large hall for recreation purposes, capable of seating fully half the number of patients in the asylum, in which a stage should be arranged in a recess at one end, with convenient approaches and dressing-rooms. In small asylums the hall is frequently placed on the ground floor, with the chapel over it, this being convenient for approaches, and also economical in construction.

2ndly, a good kitchen, with sculleries, larders, and pantries sufficient for all patients and officers in the asylum, and near to the recreation hall, if this be used as a dining room. In some asylums one or two large patients' dining halls are provided in addition to the general hall, when this is used exclusively for recreation purposes. Mess-rooms for attendants and nurses should be situated near the kitchen.

3rdly, a general or steward's store, which, like the other buildings, should be easily accessible from both sides, and also have a cart road approach for delivery of stores.

4thly, the laundry buildings, which, if not quite central, should be on the women's side, but with a direct approach from the men's wards, and should comprise wash-house and

ironing-rooms, foul wash-house, and, in large asylums, separate wash-house for officers' linen; also, drying stoves in each of the wash-houses. An admirable system of drying, which I first introduced at Nottingham, and am now using in two other asylums, is obtained by blowing or drawing warmed air through the horses by a fan. The clothes are thus dried much quicker, and with a fresh and sweet result. I find at Nottingham that before all the horses are filled, the clothes are dry on the first horse, and thus a constant succession of changes can be made, and the clothes dried as quickly as they are washed.

5thly, the central buildings should also include, near the principal entrance, one or two good visiting rooms; also committee, waiting, and porters' rooms, a superintendent's office, and rooms for the assistant medical and other officers of the asylum.

The superintendent's house,—which, in many asylums, is incorporated with the central block,—should, in my opinion, be an entirely detached building, or, at the most, be connected with the asylum by a corridor of some length.

The responsibilities of a superintendent make it very desirable that he should at times be able to shut his mind to his work, and this he could do more effectually if his house were some little distance from the asylum. Moreover, if a married man, it is not fair to his family that they should be brought up in close association with the asylum and its influences; and I venture to think further, that a superintendent's work would generally be better done with his office in the asylum and his house some little distance away, and without any corresponding disadvantages, providing that a telephonic or other means of communication be arranged between his house and the asylum, and that one or more assistant officers sleep in the main building.

The position of the chapel is another vexed question. It should be designed in all respects to convey to patients the idea of church, and for this reason is better a detached building in the grounds. On the other hand, it is very undesirable in wet weather to have to take several hundred patients some distance to church. When possible, it is best to erect it outside the main building, with a connecting corridor in addition to outside entrances, either of which may be used.

Separate blocks for nurses and attendants, containing sitting and club-rooms, where they can associate when off duty, with bedrooms above for those who do not sleep in the wards, are very desirable adjuncts.

A dispensary is always required; and sometimes an operating-room, with one or two sleeping-rooms adjoining, is a great convenience,—indeed, almost a necessity in a large asylum.

Workshops should also be provided on the men's side, with separate shops for different workers, the variety and size of these shops being governed by the number and class of patients; and, in country asylums, farm buildings in a convenient part of the estate.

An isolation hospital, a short distance from the main building, should be constructed for infectious cases; this should comprise an associated dormitory with one or more single rooms on each side, a kitchen, laundry with disinfecting stove, and other necessary adjuncts.

Mortuaries for both sexes, with *post-mortem* room, should be in a separate block, away from the main building.

I have, I fear, already exhausted more than my allotted time, and I dare not trespass further on your patience by saying anything on details of construction or internal fittings, though very much of the success and comfort of an asylum depends on the consideration given to these details. Nor have I time to touch upon the subjects of drainage and disposal of sewage, water supply, and service, lighting, by gas or electricity, all of which are matters of much interest, and with which the asylum architect must be well conversant. One further subject which I must refer to is that of heating and ventilation, which is so all-important a matter in asylum construction that my paper would be incomplete without it.

In my opinion any system for warming and ventilating should fulfil the following conditions:—

1st, it should offer the least risk of injury to patients by accident or danger to the building by fire;

2nd, it should be under the perfect control of the engineer, who should be able to raise or lower the temperature in any ward readily;

3rd, one system should combine the double duty of warming and ventilation;

4th, ventilation should not be dependent on natural atmospheric action, which cannot always be relied upon to create a circulation of air;

5th, and lastly, it should be reasonably economical in working.

After long consideration, and some years of experience, I have come to the conclusion that the right system is one of air warmed over hot water or steam-pipes, and propelled into the wards by a fan, through underground trunks, and vertical flues in the walls communicating with all the rooms, and a similar system of extraction flues, by which the vitiated air is expelled.

It must be understood that I do not advocate air warmed by fire heat,—a method which may seriously deteriorate its quality, a result not to be feared by warming over steam batteries, which plan has the further advantage of allowing the temperature to be quickly raised or lowered in any particular ward by a simple arrangement of pipes and valves.

I cannot attempt to describe my system in detail, but will merely call attention to a few important points:—

The air which is propelled into the building must be drawn from a situation untainted by obnoxious surroundings.

The trunks and flues must be carefully calculated in proportion to the size of each room. Many failures in ventilation are due to ignorance or neglect of this.

Separate trunks for day and night service should be arranged, with simple shutter-valves for closing the one and opening the other at morning and night.

The extraction flues should communicate with upcast shafts of some height, say in towers, to carry well away the vitiated air.

The fresh warmed air should enter the rooms near the top, and the vitiated air be withdrawn near the floor; experience having taught us that this is right; for, if the positions of inlets and outlets were reversed, some deleterious gases would not readily ascend to escape at the top, while the warm air, entering at the bottom, would quickly ascend and pass out without mixing thoroughly with the surrounding atmosphere, as it must do if driven in at the top, and be allowed to spread over the whole surface of room, gradually falling as more air is forced in above it, and vitiated air extracted below.

When ventilation is required without heat, the fan may be used to drive in air at its normal temperature, the stagnant atmosphere in the rooms being of necessity displaced either through the extraction flues or the open windows.

One great advantage of this system is that heat can only be obtained in conjunction with ventilation, which is not always the case with steam or hot-water pipes *in* the wards, where a close stuffy heat is generally the result.

I cannot better illustrate the results of this system than by quoting from a recent report of the Superintendent of the Nottingham Borough Asylum, where I have lately introduced it in the new male annexe:—

"So efficiently has the heating been done, that a temperature of 60 deg. has been easily maintained throughout the wards without the aid of any fires, and this when the thermometer outside registered 10 deg. of frost. The dormitories and single rooms are just as easily warmed at night.

Those who are acquainted with the working of an asylum will readily imagine the immense comfort of being able to do without fires in the wards. There is no crowding round the fireplaces, and no quarrelling for the best seats, bnt the patients sit scattered about at the windows and at the tables, just as in summer. It was expected that there would be some grumbling at first at the absence of fires, but, strange to say, I don't think I heard a single complaint. Another great advantage this system of heating has over most others is the entire absence from the rooms of all pipes and other heating surfaces.

The ventilation is also equally successful. It is very observable in the dormitories and single rooms; the air in these appears to be almost as pure in the morning when the patients get up as in the evening when they go to bed."

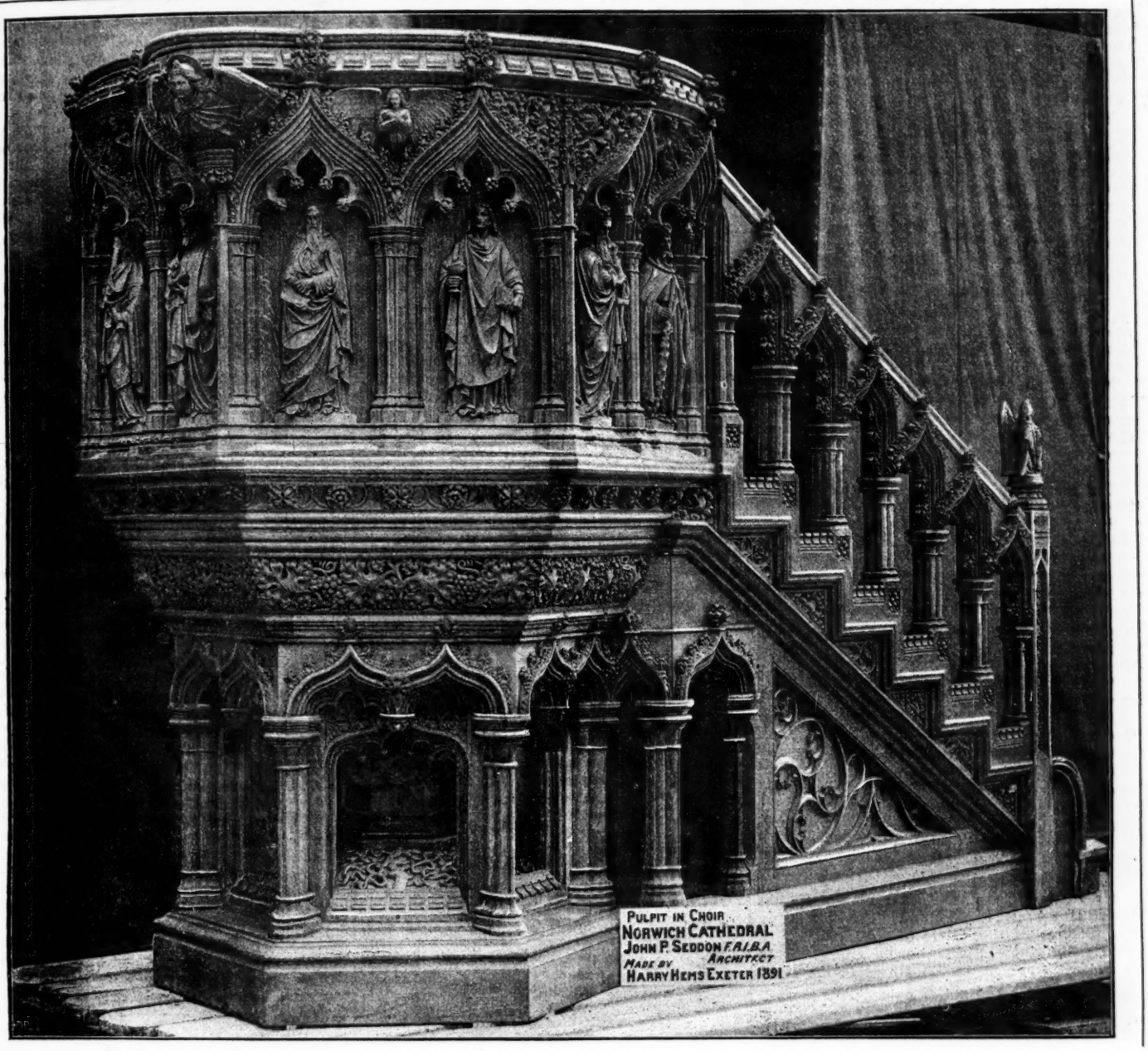
In conclusion, I must express my regret at the time I have been compelled to take in order to describe, but briefly, the arrangement of an asylum. There are very many interesting points of detail and construction I should like to have referred to had it been possible. I hope, however, my shortcomings will be remedied by others present in the discussion which is to follow.

In the discussion which followed,

Mr. Rogers Field, M.Inst.C.E., said that mere design in the arrangements of an asylum was in the province of the architect rather than in that of the engineer; but the water-closets and the sanitary arrangements generally were matters for the engineer. The first question was, how were they going to treat the inmates of an asylum? Should they be treated as responsible persons, or were they to be treated as not rational beings? Were they to use a pull in the water-closets, or an automatic apparatus acted upon by the door or the seat? Were they to mistrust the patients, or were they to employ apparatus to be worked by the patients themselves? He agreed with Dr. Saunders in thinking that to treat the insane as irrational beings was not the right way. Two types of apparatus had been tried. Where the ordinary pull was employed, it had at first to be worked by the attendants, but aftera time the patients learnt to work it perfectly. Everything he had seen in the last ten years confirmed him in the opinion he had long ago formed, that patients in asylums might be trusted to use the ordinary apparatus. If the flush was automatic, working through the movement of the door or the seat, the apparatus was always getting out of order. He had been appointed to report upon the sanitary arrangements at a well-known asylum. In the examination he had made, he found that three-fourths of the automatic flushing apparatus were not acting.

Mr. W. M. Mackison (City Engineer, Dundee) preferred that the windows in asylums should have, not a southern, but a western exposure. As the prevailing winds were those blowing between east and west, the western aspect was the most salutary. He agreed with the author of the paper with regard to the tiling of walls. With respect to the ventilation of buildings, he had no faith in apparatus for extracting air, because they caused a draught, and a draught was always bad. In a hospital with which he was connected they took pure air from a high tower and admitted it into the wards through an inlet placed about 6 ft. above the patient's bed, and also by an inlet placed below the level of the bed. Fires were of no use except to give a cheerful aspect to the wards.

Sir Robert Rawlinson said he had had an extensive and varied experience of the arrangements for asylums. He had regularly been consulted by the Commissioners in Lunacy, and had examined many sites. With regard to the position and arrangements for water-closets in asylums, there was necessarily a great difference in different asylums. In some the patients could be trusted, but in others not. Some patients would get their hands down into the pan, if they could, to collect any soil or incrustation that might have accumulated, and try to eat it. Such patients should be specially provided for. With regard to earth-closets, which the Government wanted to see introduced, generally there was again trouble with the class of what were called "the dirty" patients, who smeared everything within their reach. They had tried railing round the seat, with a 10-ft. fall below, so that such patients could not get at the excreta, but they found that more water was wasted in cleansing and keeping clean the apparatus than flushing apparatus would have required. Many years ago at Wakefield Gaol, where the prisoners were treated on the separate and silent system, there was a great outbreak of typhoid fever. The result of an examination by medical experts was an utter condemnation of the whole building, root and branch. He was called in, in answer to an imploring request to the Local Government Board to save the local authorities, if possible, from the necessity of expending 70,000*l.* on a new prison. After a brief examination, he found on each side of one end of a dividing wall a pan-closet, each closet being connected with the sewer by a 4-in. pipe-running straight down the wall into the sewer, which was never cleansed nor flushed. The criminals found out that by lowering the trap or pan and holding their heads down over the container they could converse through the closets with the prisoners on the other side, but while doing so they were breathing the sewer-gas, and hence the outbreak of typhoid fever. He examined the drains, and directed a 4-in. pipe to be continued up to the eaves to carry up the foul air. He found that the drains could be kept clean by flushing. The Governor of the



gaol invented a pan which, by means of a 4-in. lip, rendered it impossible for a prisoner to get his hand down or to remove the trap. These alterations, though simple and inexpensive, were effective, the infection disappeared, and the authorities were spared the great expense of a new prison. The flushing-tank,—and it was here that Mr. Rogers Field came in,—was, he felt bound to say, one of the greatest inventions of modern sanitary science, and it owed its progress more to Mr. Rogers Field than to any other sanitarian. The fame of the invention would long outlive the inventor, and he hoped that posterity would not fail to erect a monument to him. Aspect was a detail to be studied in all plans. His (the speaker's) own room had an eastern aspect, with the sun shining upon it till midday. For twenty years he had occupied a bedroom with a western aspect, but he got no benefit from it because he was never in bed late enough. The benefit of a circulation of air could not be over-estimated. At night his window was open (with Venetian blind down), and he thanked God that no window he ever knew of was air-tight. This was shown by the fact that a London fog would get into every nook and corner of any house in half-an-hour. Windows with 6 in. beads at the bottom, so as to allow of being opened at the meeting-rail, were no danger even in winter. The air in rooms provided with them was always sweet. The same principle was carried out in his stables, where he had never required the veterinary surgeon for twelve years. He had 12-in. openings over each horse in the stables, for he found that horses, not less than human beings, wanted fresh air.

Mr. H. H. Statham said he was glad to hear the remark with regard to the admission of air at the lower part of the room, and he rose to support it. In admitting air at the top they were opposing natural action, but in admitting it at the bottom natural action was helped. Fouled air always had a tendency to find its way to the top, and to bring the fresh air from the top was to bring it through a stratum of fouled air, some of which it would drag down with it.

Mr. Blair (Borough Surveyor of Bootle) said there were two well-known plans of ventilation, the first being that by which the air was extracted from the top; and the second that by which it was extracted from below. He had experience of two police-courts in which these plans had been respectively carried out. In the first case, where the air was extracted from the top, the result was good when the court was empty; in twelve minutes the air was entirely changed. But when the court was crowded the case was altered. The air very soon began to smell even near the bench. In the other court, which was supplied with Tobin's tubes placed at the top, there was never a smell. The extraction of foul air from the floor was in his opinion the best plan.

Mr. Mackison (Dundee) added that he had been led to adopt a mixed system, combining the two principles. If he put in pure air, he was sure of obtaining an advantage, but if he extracted air, he might take out pure air with the impure.

Mr. G. T. Hine, in replying to the various speakers, said two points which had been referred to ought to have a word in reply. When Mr. Mackison advocated wards with a western aspect rather than those facing the south, he probably had in mind a fever hospital. In building a hospital where the patients were always in bed, wind was a more necessary element than sun, but in lunatic asylums, sunshine was a necessity if a cure was to be effected. The patients would be up and about, and opportunities should be given for exercise at all hours of the day in the open air. In large buildings, such as the Claybury Asylum, they should be glad to get any outside aspect, east, south, or west, but if the principal front was to the south, they must have east or west as well. The other point had reference to the vexed question of how air ought to be admitted into a room. All depended upon the system adopted. If they trusted to nature, the proper position to extract was the top of the room. He had studied the question for many years, and had made extensive experiments. When the question of inlet and outlet flues was first before him, he was as sceptical as a good many of those present. While building large Board Schools for 1,100 or 1,200 children, he had determined to try extraction from the top in one case, and extraction from the bottom in the other. He did not employ the Blackman fan, but something adapted to effect the same purpose. It was obvious that if mechanical power was employed to force air into a room, if the room were warmer than the surrounding atmosphere, the warm air would rise to the top of the room, and half of it might escape without mixing with the surrounding air, just as water might be forced through a lake, leaving the great mass of the water in the lake stagnant.

The President then rose to close the proceedings of the Section. The time had arrived, he said, when, in the name of the Council, it was his duty to thank all gentlemen who had presented papers and taken part in the discussions. He owed to all his personal thanks for the way in which he had been supported in the execution of his duties. If he appeared to have been severe, it was only in order to give due time to everybody. With regard to papers which had not been read *in extenso*, they would appear in the "Transactions." The Section was to be congratulated on the character of the papers presented and the quality of the discussions upon them. They had been as good as those at any preceding meeting of the Congress,

and would be of great value. There might not have been anything very new presented, but known things had been presented in new and striking lights. It was only by pegging away that they could get such sanitary reforms as the welfare of the public demanded.

Professor Aitchison, A.R.A., proposed a vote of thanks to the President. They must all feel that he had done his work well, and that his demand for indulgence was not called for. The members of the Institute of British Architects were so well acquinted with Sir Arthur Blomfield's fairness that when any side issues were likely to be raised in a discussion, they generally chose Sir Arthur Blomfield as their chairman, on account of his great sagacity in not allowing irrelevant talk. Overwhelmed as he was with an enormous practice, to give five or six hours every day to the work of the Section was a sacrifice for which they could not be too grateful.

Mr. H. H. Statham seconded the resolution. One of the first duties of a chairman was to be strict and to keep order. At the same time, no one could have been more courteous, or could have presided over that Section with greater ability.

The motion having been carried by acclamation,

Sir Arthur Blomfield said he was extremely obliged to them. It was a great honour and pleasure to have given satisfaction, but he could not forget to what a great extent he was indebted to the excellent work done by the secretaries of the Section, and it would ill become him not to claim for them a vote of thanks from the Section. He had great pleasure in making that proposition.

Mr. G. T. Hine seconded the vote, which was carried by acclamation.

Mr. Ernest Turner, Dr. Sykes, and Mr. T. W. Cutler, the three honorary secretaries, having severally acknowledged the compliment,

Mr. Mackison said that perhaps the meeting would be glad to learn that the Chief Magistrate of Dundee, believing that all corporations ought to help in the good work, had made himself responsible for forty copies of the "Transactions." He hoped other corporations would follow the example.

Mr. Rogers Field proposed a vote of thanks to the Honorary Presidents. He was expressing the feelings of the whole of the members of the Section when he said that he felt they owed to Professor Fenger, of Copenhagen, Professor von Grüber, of Vienna, and Professor Trélat, of Paris, a deep debt of gratitude for coming so far.

The vote having been carried by acclamation, Professor Fenger briefly replied, and the proceedings of the Section were closed.

"*Low Tenements*": *A Correction.*—Mr. Locke Worthington writes to say that he was misreported on p. 167 of our last number. With regard to the improvement of existing small houses, what he did say was that "if well-carried out and superintended, Miss Octavia Hill's plan of purchasing houses, purifying and fitting them for habitation, is excellent and beneficial in all ways. With rentals varying from 2s. to 10s., the cost of accommodation per family has been 118*l.* to 130*l.*, and pays an average of 4 to 5 per cent. On the other hand, the cost of accommodation per family in such high model blocks as are to be found in Farringdon-street varies from 171*l.* to 315*l.*" He disclaims having referred to the efforts of Miss Octavia Hill in Farringdon-street "in terms of praise."

[Having now completed our full report of the Section of Architecture, we will during the next two or three weeks give selections from some of the papers read in the Engineering and other Sections, as space allows.]

NEW PULPIT, NORWICH CATHEDRAL.

As we are giving this week a view and plan of Norwich Cathedral, one of our series of the English Cathedrals, we give also (on the preceding page) a reproduction of a photograph of the new pulpit in the choir, executed by Mr. Harry Hems from the design of Mr. J. P. Seddon.

Our special series of Cathedral illustrations is only intended to include original Mediæval work; but some of those who are interested in Norwich Cathedral may be pleased to have an illustration of a piece of new work there, in the same issue of the paper.

Correspondence.

To the Editor of THE BUILDER.

"LONDON ARCHITECTURE."

SIR,—I have seen no notice in any of the architectural journals of a most ably-written and instructive article in the *Edinburgh Review* of July last, and entitled "London Architecture in the Nineteenth Century." May I, therefore, be permitted to draw the attention of those interested in the history of modern architecture in London to the very valuable information it contains? The wide knowledge displayed, coupled with exceedingly just and fair criticism, give it great interest and importance to the profession generally.

JOHN BELCHER.

*** The article was mentioned, and a brief quotation given from it, under the heading of "Reviews and Magazines" in our issue of August 8.

RUSHES AS A KEY FOR PLASTERING.

SIR,—While inspecting some old houses in Shoreditch, I noticed that the plastering of the ceilings was supported by a kind of rush or straw, instead of laths. These were laid at right-angles to the joists, and under each joist was a stout lath, which kept the rushes in place.

Can any of your readers state where these materials were obtained, and at what period they were used? HENRY LOVEGROVE.

STABLE DRAINAGE.

SIR,—In your issue of the 22nd ult., page 157, you have a paragraph on stable drainage in which you say, "We have received from Mr. A. T. B. Ward drawings of his system of stable drainage, the principle of which is to avoid all traps in the stable," &c.

We do not know who Mr. Ward is, but as we introduced this system some five or six years ago, and have lately improved it, and designed and made a gully or interceptor which is exactly described by your paragraph,—as you will see by reference to the enclosed advertisement issued last Christmas,—it would almost appear that Mr. Ward had seen our gutter, &c., and copied it.

HAYWARD, BROS., & ECKSTEIN.
COTTAM & WILLMORE.

*** The description of the work is certainly very similar to that in Mr. Ward's circular, though the sectional diagrams differ somewhat.—ED.

The Student's Column.

MARBLES.—X.

THE beauty of marbles is dependent primarily upon two things, their colour and pattern, and it is difficult to decide which of these is the more important from a commercial point of view. The nature of the colour of marbles has never been very exhaustively treated of; to do so it would be necessary not only to trench considerably upon the science of chemistry, but each kind of stone would have to be analysed, and even parts of each must be separately studied in the laboratory. Much material is available on that head which could be brought together and made highly instructive, but in a general series of articles like the present we could not devote sufficient space to deal with the matter in that form. At the same time, it is hoped that the following remarks on what is, perhaps, the highest branch of the scientific aspect of our subject may give the student a general idea of the nature and disposition of the colouring matter of marbles. It may be remarked *en passant* that some knowledge of the nature of the colour frequently leads us to appreciate the methods of weathering, so that the subject has an additional interest from a practical standpoint.

The colour of stone is, as a rule, dependent more upon its chemical than its physical properties. The predominance of minerals of pronounced tints, however, frequently imparts a colour which more or less obliterates the effect of the general ground-mass. For example, the colour of granites and similar rocks is sometimes varied in shades of light and dark, according as the felspars are clear and glassy and absorb the light, or are white and opaque and reflect it.

It is remarkable that of all the bases, none show so much affinity for colouring matters as alumina, peroxide of iron, and peroxide of tin. Experimentally, it is found that if a solution of any colouring matter be agitated with a sufficient quantity of the hydrates of any of these bases the solution becomes decolourised, the whole of the colouring matter combining with the base, and forming a coloured compound.

The principal colouring matter in nearly all rocks is due to disseminated iron oxide, and it sometimes happens that the most highly-coloured rocks are most deficient in workable ironstone. We have a good instance of this in the variegated strata of the new red sandstone, a subject very exhaustively treated* by Mr. Maw, of Broseley, and the same remarks, in general, apply to several limestones and marbles. He found that the colouring is effected by films both of the anhydrous and hydrated sesquioxides investing the individual grains of sand. In many of these cases of intense colouring it is the degree of dissemination, rather than the amount of iron, which produces such a striking effect. The intermediate colours are due to the blending of the anhydrous and hydrated peroxide. It is probably owing to the deficiency of organic matter in these red rocks that they remain red still; they were coloured in the first instance by solutions of ferrous carbonates and sulphates depositing the insoluble peroxide, and, for lack of reducing agents in sufficient amount, the iron of these beds has not been rendered soluble, and, therefore, remains disseminated instead of being concentrated.

The oxides of iron impart a brownish or reddish hue; the carbonate or sulphide a bluish or grey. Carbonate of iron is a salt which, when crystallised, is translucent and perfectly colourless, and in its amorphous forms is pure white, hence the shades of dull blue seen in, say, the marble oolite used in the manufacture of chimney-pieces in Northamptonshire and Lincolnshire during the Middle Ages, cannot be due to that alone. Speaking of this subject, Professor J. W. Judd, F.R.S., says† that the colouring matter, it is probable, bears only a very small proportion to the mass of the rock, the bluish colour being certainly not more intense than in many limestones, which weather perfectly white, and which when analysed are found to contain only a very small percentage of iron. M. Ebelman has shown‡ that the cause of the blue colour in many oolitic stones, similar to the marble now under discussion, is the existence of a small quantity of sulphide of iron diffused through the mass.

A very light or nearly white tint usually denotes the absence of heavy metallic oxides, especially of iron in any of its forms. On the condition of the iron is dependent also the permanency of colour. Either of the sulphide, carbonate, or other protoxide compounds are liable to oxidation, and hence stones containing it in these forms fade, or turn yellowish and stain on exposure. The sesquioxide, on the other hand, can undergo no further oxidation, and hence the colour caused by it is the most durable; as a rule, therefore, the decidedly red colours may be considered the most permanent.

Yellow, as a dull earthy colouring matter, almost always indicates the presence of hydrated peroxide of iron. Sir A. Geikie says, with reference to volcanic districts, that the colour may be due to iron-chloride, sulphur, &c. Bright, metallic, gold-like yellow is usually that of iron-disulphide.

Black may be due either to the presence of carbon (when weathering will not materially affect it), or to some iron oxide, chiefly magnetite, or silicate rich in iron, as in the minerals hornblende and augite. Many basalts and dolerites which look quite black on a fresh surface, become red, brown, or yellow on exposure.

Bluish tints are produced by the presence of ferrous oxide; some of the slates in the Skiddaw district contain as much as 8 per cent. of this. At the mouth of the Madawaska river, Ottawa, there is a great extent of crystalline limestone marble of a bluish-grey colour, apparently from an admixture of plumbago. This colour is irregularly distributed, some portions being nearly black, and others almost white, so that such a marble often presents a striped or barred appearance; different portions of the marble vary in the size and arrangement of the coloured bands.

* See "Proc. Geologists' Assoc.," vol. xi. (1889) p. 108.

† "Geology of Rutland, &c." (Mem. Geol. Survey), 1875, p. 127.

‡ "Bull. Soc. Géologique de France," 2e sér., t. ix. p. 221.

Green is a colour very frequently exhibited in marbles. Serpentine rock affords goo examples of varying shades of green and red. M. Delesse has shown* that the variations of colour in that rock are, in a great measure, due to the proportion and degree of oxidation of the iron which it contains. Major-General McMahon, in treating of the subject, states† that the colour of serpentine is due to an admixture of the oxides of iron and chromium. The iron imparts various shades of black, brown, green, yellow, and red to the rock, according to "its degree of oxidation and state of combination." We may remind the student that chromic oxide, which is usually present in serpentine in combination with iron, is a substance used in the arts for the purpose of giving a beautiful green colour to glass, and it forms a valuable pigment in enamel painting. The chromic salt ranges from green to purple, and a small admixture of chromic oxide increases the variety and richness of the shades of colour, due primarily to the iron. The deep red veins running through the rock result from the ferric, or red oxide of iron.

As examples of the utility of the science of chemistry in enabling us to form some idea of the nature of colouring matter in serpentine marbles we may quote a few analyses of the rock, appending a short description of each kind of stone referred to :—

	I.	II.	III.	IV.
Silica	38·29	40·12	40·83	40·30
Aluminia	—	2·00	0·92	—
Protoxide of Iron	13·50	3·47	7·39	7·02
Oxide of Manganese	—	—	trace	0·26
Oxide of Chromium	—	—	0·68	trace
Lime	—	—	1·50	—
Magnesia	34·24	40·04	37·98	39·07
Water, &c.	12·09	13·36	10·70	13·35

I. Refers to the red serpentine of Kynance Bay, Lizard, Cornwall (Dr. Haughton, "Phil. Mag." vol. x., 1855, p. 254). As will be perceived, the protoxide of iron is very abundant in this rock, and clearly indicates the nature of the red tints. No oxide of chromium is recorded, but in the ornamental serpentine from the Lizard, which varies from dark green to black, and is spotted with red, we find that it is present. See analyses of Cornish serpentines in "Quart. Journ., Geological Society," vol. xlvii. (1891), p. 466.

II. Light green, from Galway (Bristow, "Glossary of Mineralogy.")

III. Dark green, from Col de Pertuis, Vosges (Delesse, "Annales des Mines," t. xviii., p. 341).

IV. Green, homogeneous, from Orford, Canada (Hunt, "American Journ. of Science," vol. xxv., p. 219).

Amongst the massive, and nearly pure, Laurentian serpentines there are those of Grenville and of Burgess, Canada, which are generally pale-yellowish, or greyish-green; unless, as in the latter locality, they are penetrated in parts by red peroxide of iron. In that series they also occur intermingled with carbonates of lime and magnesia, and disseminated in grains, or forming veins, both in limestones and dolomites. The serpentines of the Laurentian series have a lower specific gravity, and contain less oxide of iron and more water than ordinary rocks of that class. The following are some analyses of these marbles‡ :—

	V.	VI.	VII.
Silica	39·34	41·20	39·80
Magnesia	43·02	43·52	38·40
Peroxide of iron	1·80	·80	7·92
Water	15·09	15·40	13·80

V. From Grenville, where it is imbedded in a white limestone. Its colour varies from light yellow to light green; specific gravity, 2·47-2·52.

VI. A similar serpentine, from Calumet Island, of a pale wax yellow; specific gravity, 2·36-2·38.

VII. Is a reddish brown serpentine, or ophiolite of Burgess, from which a portion of the carbonates of lime and magnesia was first removed by acetic acid.

Green, as the prevailing tint in rocks, occurs also amongst schists; it appears* amongst massive rocks, especially those of the older geological formations, where hornblende, olivine, or other silicates have been altered. Carbonate of copper imparts a vivid green to several kinds of marble.

* Zirkel. "Petrog." i. p. 320.
† "Proc. Geologists' Assoc," vol. xi (1890), p. 427.
‡ "Geology of Canada" (Geol. Survey), 1863, p. 472.

SURVEYORSHIPS.

CHELMSFORD.—On the 26th ult., at the quarterly meeting of the Chelmsford Town Council, Mr. G. H. Sasse was elected as Surveyor to the Chelmsford Town Council, in the place of Mr. C. Law Green, resigned. The Special Purposes Committee reported that 101 applications had been received for the post, and they had selected the following four to appear before the Council, viz. :—H. G. Coles, Surveyor to the Market Harborough Local Board; J. S. Morley, Assistant Engineer to the West Ham Corporation; G. H. Sasse, Surveyor to the Tendring Hundred Rural Sanitary Authority; and W. Sykes, Surveyor of new streets, Fulham. The first vote resulted as follows: Coles, three; Morley, three; Sasse, nineteen; Sykes, sixteen. The names of the first two were then struck out, and a final vote was taken as between Messrs. Sasse and Sykes. It resulted as follows: Sasse, thirteen; Sykes, eight.

NAIRNSHIRE. — Mr. David Mackenzie, C.E., Surveyor to the Biggleswade District Highway Board, was unanimously elected County Surveyor of Nairnshire by the Nairn County Council, at their special meeting held on the 27th ult. There were forty-two applications for the post.

GENERAL BUILDING NEWS.

BOARD SCHOOLS, EDINBURGH. — Mr. Robert Wilson, the Architect for the Edinburgh School Board, has prepared plans for a new school, providing accommodation for 600 pupils, to be erected on a site on the west side of Comiston-road, South Morningside. The building will be similar to the other board schools, two stories in height and having separate entrances on either side for boys and girls and playground for each in the rear. The cost of erection, including janitor's house, is estimated at about 9,000*l*.

WESLEYAN CHAPEL, DENABY MAIN, YORKSHIRE. —The memorial stones of a new Wesleyan Chapel were laid at Denaby Main on the 17th ult. The chapel will be capable of seating 500 people. It will include the chapel proper, 67 ft. 3 in. long by 40 ft. wide, with three vestries and organ gallery. The building will be built of red brick, with Heather brick facings and mouldings, the style being Gothic. The internal fittings will be of pitch-pine. The total cost is estimated at 1,500*l*. The architect is Mr. Charles Keyworth, and the builders Messrs. Arnold & Sons, of Doncaster.

WESLEYAN SCHOOL BUILDINGS, CARDIFF.—On the 26th ult. memorial stones were laid of a new Wesleyan Sunday School, which it is proposed to build in Conway-street, Cardiff. The new premises will afford accommodation in the main building, on the ground floor, and in the galleries, for about 700 children, and, when the class-rooms are thrown open, for an audience of 900 juveniles. The buildings are from designs by Messrs. Habershon & Fawckner, and are being erected by Mr. W. G. E. Griffiths, contractor, of Cardiff. The front block of the premises, besides vestibule, entrance hall, and corridor, contains on the ground floor infant class-rooms on either hand, each 24 ft. by 20 ft., with class-rooms for adults. At the rear of this block, and approached by the central corridor, is the assembly hall, 58 ft. by 35 ft., surrounded by a gallery. On each side of the hall, both on the ground floor and from the gallery, open a series of class-rooms, 21 in all. The assembly hall has a height of 34 ft., and is lighted from a clearstory roof (with fan-lights opening for the purposes of ventilation), as well as by a Geometrical window with cathedral-tinted glass over the end platform. Further ventilation is provided in the ceiling by panelled outlets for vitiated 'air. The principal timbers of the roof are exposed to view, and the whole of the internal woodwork is stained and varnished. The building will be warmed by hot water on the small-bore principle.

CLUB BUILDINGS, SWANSEA.—A Liberal Club which has been erected in Wind-street, Swansea, was opened on the 29th ult. by Lord Herschell. The premises have a frontage to Wind-street. The façade is in the style of the French Renaissance, divided into bays by pilasters with carved capitals, and finished at the top by a balustrade. The lower portion of the front to the first floor is of Forest of Dean stone, and the remainder is in Bath stone. The ground floor contains premises for the London and Provincial Bank. A billiard-room, having three tables, and approached by a vestibule lined with mosaic adamite, is on the ground floor, where there are lavatories and other offices. The whole of the basement is utilised for cellars and skittle-alleys. On the first floor is the reading-room, which is 43 ft. by 26 ft. 6 in., and is lighted by windows facing the street. Behind is the bar and dining-room and a large lavatory. On the second floor is another room corresponding to the reading-room below, and divided by a movable screen. On the same floor are the secretary's offices, committee-rooms, sculleries, and kitchens. The members' bath-rooms, the stewards' and servants' rooms, are on the third floor. The builders were Messrs. Thomas, Watkins & Jenkins, and the architects Messrs. Bucknall & Jennings, of Swansea.

* Geikie, "Text-Book of Geology," 1882, p. 92.

CHURCH OF ST. JOHN'S, BIRCHGROVE.—On the 27th ult. the opening services in connexion with the new church of St. John's, Birchgrove, Llansamlet, Glamorgan, were held. The church comprises a nave, tower, and vestry, with ample room for extension eastward. There is not any separate chancel at present, but at the east end there is a space railed off as a substitute, laid with encaustic tiles and fitted with a communion table. The total length of the church is 46 ft. 6 in. in the clear. The nave is 34 ft. 5 in. in length, and the aisle is just over 7 ft. wide. The building is built of native grey stone, with Freestone dressings. The plans were prepared by Mr. John Birch Paddon, of The Drymma, Neath.

PUBLIC ROOMS, BODMIN.—On the 31st ult. the memorial stone of the new Public Rooms in course of erection at Bodmin was laid by the Hon. T. C. R. Agar-Robartes. The design for the building was obtained in competition, and Mr. Octavius Ralling and Mr. Lewis Tonar, of Exeter, were the authors of the selected design. Mr. Sampson Trehane, of Liskeard, is the builder. The accommodation is obtained on three floors. In the basement is placed a drill-hall 40 ft. by 26 ft. On the ground floor the main hall will be situated, which is 80 ft. by 40 ft. Running round the side of the building facing Queen's Head-yard is a causeway carried on masonry arches. On the first floor will be a small hall occupying the space over the vestibule and cloak-rooms, having an external stone staircase from the level causeway, and an internal staircase from the vestibule. In the basement Luxulyan granite forms the piers and arches, under the latter of which the windows and doorway will be of Ham Hill stone. The main body of the work will, however, be of local stone, worked generally as rock-faced work. The roof externally will be covered with small Delabole slating, with a few bands of Welsh slate. Internally the woodwork will be principally pitch-pine, varnished, and the wall stuccoed above a high-panelled dado. The heating proposed is by hot water, and the lighting by gas. The main hall will be lighted in the daytime by nine windows of three lights each. The features of the Mount Folly elevation are a gable, having the founder of Bodmin (King Athelstan) carved in a circular cusped and foliated panel seated on a throne. At the Friary end of the front is a smaller gable.

MEMORIAL CHURCH, BRITHDIR.—On the 25th ult. the Dowager Lady Williams Wynn laid the foundation stone of the Memorial Church in the township of Brithdir, in the parish of Llanrhaiadr-yn-Mochnant, Montgomery, to be erected by public subscription in memory of Bishop Morgan, who, while vicar of the parish 300 years ago, "finished his great undertaking of translating the Bible into the Welsh language." The site, which is half way between Llanrhaiadr and Llanfyllin, has been presented by Colonel Bonnor. The new church has been designed by Mr. W. H. Spaull, of Oswestry, diocesan architect.

WESLEYAN CHAPEY, WHITBY.—On the 1st inst. a new Wesleyan chapel, which has been erected on the site of Brunswick Chapel, was opened at Whitby. The chapel has been built on the transeptal plan, and shallow galleries are provided on three sides. The seats are arranged to accommodate 900 worshippers, over 500 being on the ground floor. The orchestra occupies a portion of the rear of the building. In addition, there are three vestries, &c. The schools are designed to accommodate about 450 scholars. The architects are Messrs. William Waddington & Son, of Manchester, and the contractor is Mr. John White, of Whitby. The probable total cost of the whole will be about 6,000*l*.

SCHOOLS, BLAYDON.—The new Board Schools which have recently been erected at Blaydon by the Winlaton School Board were opened on the 1st inst. The building is situated in Shibdon-lane. The schools are built of dressed stone, the roofs being covered with blue Welsh slates. The building is divided into three separate departments, for boys, girls, and infants, the whole being surrounded by garden-ground. Accommodation will be provided for 750 children. There are also two houses set apart for the teachers and caretaker. The total cost of the erections is 8,250*l*. The schools have been designed and carried out under the supervision of Mr. T. C. Nicholson, architect, of Newcastle, the contractor being Mr. Robert Smith, of Winlaton.

SCHOOLS, WHITLEY.—On the 29th ult. the new Sunday schools in connexion with the Methodist Chapel, Cullercoats and Whitley, were opened by Mrs. Benson. The schoolroom is 60 ft. long by 31 ft. broad, and 21 ft. high. Ald. J. Elliot, J.P., North Shields, was the contractor, while Mr. E. Bowman, Newcastle, was the architect.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised	Premium.	Tenders to be delivered.
*Plans and Estimates for Sewage Disposal	South Stoneham R.S.A.	Not stated.....	Sept. 28
*Additions to Municipal Buildings.....	Bath Town Council ..	100*l.* 75*l.* and 50*l.*.....	Oct. 31
*Proposed Buildings—Association for Promotion of Art and Music, Glasgow....	The Executive Com...	Not stated.....	Dec. 1

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Designs to be delivered.
*Firewood	Epsom Union	*Official*	Sept. 7
Pipe-sewer, Water-main, &c. Caerphilly..	Pontypridd, R.S.A. ..	G. S. Morgan	Sept. 8
Setting, &c., old setts.....	Sowerby Local Board	E. Hartley	do.
Retaining Wall	Soyland Local Board ..	J. Wadsworth.....	do.
Drill-Hall, Corty-street, Bridgend.....	.....	P. J. Thomas	Sept. 9
Drainage and making Footpaths at Cemetery	Wetheral Burial Bd.	A. W. Johnston	do.
*Iron Work, Hatton Reservoir, Leven	Police Commrs.	J. & A. Leslie & Reid	do.
*Rebuilding part of Quay Wall, Ayr	Harbour Trustees	J. Murdoch	do.
*Cement Pavement, Penzance	.....	Oliver Caldwell	do.
Cemetery Chapel and Entrance Gates, Wetheral	Wetheral Burial Bd.	A. W. Johnston	do.
Improvements to Church, Annalong, Co. Down	.....	H. Leaver	Sept. 10
New Road, &c. Higher Mount Gould, Lipson	Corporation of Plymouth	G. D. Bellamy.....	do.
*Private Street Works	Barking Town L. Bd.	C. J. Dawson	do.
House and Shop, Crawcrook, Durham....	Mr. Rowa	.....	do.
*500 2-in. Fire Cocks	Glasgow Police Comrs.	.....	do.
*Twelve Dwelling-houses, Belfast.....	.....	S. P. Close.....	do.
Store and Outworks, Jump, Barnsley	Co-operative Society..	G. Moxon	Sept. 11
Nine Houses, &c. Jump, Barnsley	do.	do.	do.
Eight Houses, Sowerby Bridge	.....	S. Wilkinson	do.
Removal of 2,389 cub.y 's. of Rock, Dundee	Trustees of the Harbour	D. Cunningham	Sept. 12
*Foundations, &c. Central Electric Light Station	Bristol U.S.A.....	H. Williams.....	do.
Infirmary for 16 Beds, Great Ouseburn ..	The Guardians	C. Hornsey	do.
2,250 tons of 48 in. Pipes and Castings....	Glasgow Corp. Water-works Commissioners	Mr. Gale	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Warehouse, &c. Extension of Offices, Hanley	Harrison & Son	W. Sugden & Son	Sept. 12
Cement Paving, Eye	Urban S. A.	.....	do.
Alterations and Additions, Blackwood School	Bedwellty School Bd.	W. L. Griffiths	Sept. 14
*Two Filter Beds, Swanston	Edinburgh & District Water Trustees	J. & A. Leslie & Reid	do.
Road-making and Sewering Works	Tottenham Loc. Bd...	J. E. Worth	Sept. 15
*Road-making and Tar-paving Works	Lewisham Bd. of Wks.	*Official*	do.
*Concrete Invert and Side Walls, Stonebridge Brook.....	Tottenham Local Bd.	J. E. Worth	do.
Broken Granite.....	East Ham L. B.	W. H. Savage	do.
*Alterations, &c. to Free Library.....	Cardiff Corporation ..	Seward & Thomas	Sept. 16
*Board School, Shenley (Herts).	The Committee	R. H. Hill	do.
School, Eastleigh, South Stoneham	School Board	W. H. Mitchell, Son & Gutteridge	do.
Pair of Semi-detached Villas, Ilkeston....	.....	G. Haslam.....	do.
Brick Sewer, Bristol	Bristol Urban S.A. ..	T. H. Yabbicom	Sept. 17
Sewage Disposal Works, Ballony, Maybole	Commrs. of Police....	*Official*	Sept. 21
Broken Granite.....	Hanwell Local Board	do.	do.
Drainage, &c. Burial Ground, Jedburgh ..	Parochial Board	.....	do.
*Public Hall and Offices	Borough of West Ham	Lewis Angell	Sept. 22
*Wrought Iron Fencing, Maryon Park	London C. C.	*Official*.....	do.
Tiling Corridors, &c. Infirmary, Hartshill	North Staffordshire Infirmary	C. Lynam	Sept. 29
*Sundry Works, Brockwell Park.....	London C. C.	*Official*.....	do.
*Wrough-iron Railings, &c. North Woolwich	do.	do.	do.
*Rebuilding River Wall, Wrought-iron Fencing, &c. N. Woolwich	do.	do.	do.
*Oak Fencing Brockwell Park	do.	do.	Oct. 5
*Gravel, &c. Battersea and Victoria Parks	do.	do.	do.
*Soldiers' Quarters, &c. Weymouth.....	War Department	do.	No date
Cheese Factory, Leigh, Stafford	.....	G. Wooddisse	do.

PUBLIC APPOINTMENT.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*County Surveyorship, Ireland.....	Civil Service Comms.	.....	Sept. 24

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, p.* xx.

PRIMITIVE METHODIST CHURCH, SHEFFIELD.—On the 29th ult. the first stones of a new church and schools in Abbeydale-road, Sheffield, for the Primitive Methodists, were laid. The building is to consist of a chapel, with schools and class-rooms. The structure is to be of red bricks, relieved with terra-cotta dressings, and it is to be of Gothic design. There will be two floors. The lower story will comprise the Sunday schools, with a library and class-rooms; also a kitchen and a heating apparatus chamber. The entrance to the boys' school will be in Vincent-road, and to the department for the girls and infants in South View-road. The chapel itself is to be on the upper floor, and accommodation is to be provided for 500 people. There will also be a gallery, five seats deep; and provision is made for the organ and choir. The minister's vestry stands under the organ chamber. The building is to be erected from the designs of Messrs. Joseph Smith & W. F. Hemsoll, of Sheffield, and the work will be carried out under the direction of the former. Mr. L. T. Wildgoose, of Matlock Bank, is the contractor. The total cost of the building will be about 4,500*l.*

BANK CHAMBERS, NEWPORT.—Referring to our notice of this building in our last (p. 175), we are asked to add that the floors have been laid with Lowe's patent wood block flooring in pitch-pine.

SANITARY AND ENGINEERING NEWS.

SEWAGE DISPOSAL AT MANCHESTER.—The Manchester Corporation are carrying out an extensive system of sewage disposal. The contract for precipitating-tanks, covering an area of eleven acres, has been given to Mr. Geo. Bell, contractor, Tottenham.

DRAINAGE OF BRAUNTON, DEVONSHIRE.—Colonel J. O. Hasted, R.E., Local Government Board Inspector, held an inquiry at Braunton recently, in respect of the application of the Barnstaple Rural Sanitary Authority for sanction to borrow 2,500*l.* for the drainage of Braunton, and to form a special drainage district comprising a half-mile radius from the Cross Tree in Braunton village. Thirty-six farmers outside that district petitioned in favour of its being formed, and 185 others within the district protested against the proposal. Mr. Arnold Thorne laid the proposed drainage scheme before the Inspector, and the proceedings soon after ended.

SEWAGE DISPOSAL, MARTOCK AND ASH, SOMERSETSHIRE.—The Yeovil Board of Guardians, acting as the Rural Sanitary Authority, have instructed Messrs. Bailey, Denton, Son, & North, of London, to advise upon the sewerage and sewage disposal of Martock and Ash, in Somersetshire.

SEWERAGE SCHEME, PLYMOUTH.—At the Plymouth Guildhall on the 18th ult., Mr. J. Thornhill Harrison, M.Inst. C.E., a Local Government Board inspector, opened an inquiry with reference to the application of the Plymouth County Council for sanction to borrow 56,700*l.* for works of sewerage, 3,000*l.* for works of street improvement, and 583*l.* for the erection of a shelter on the Hoe Recreation Ground. The Town Clerk, Mr. J. H. Ellis, in giving a description of the proposed sewerage works, explained that the chief application of the Council was for 56,700*l.* for the construction of intercepting sewers.—The Borough Surveyor, Mr. G. J. Bellamy, said that they did not propose to interfere with the very ancient system of sewerage at present used at Millbay. By the new sewers, sewage would be discharged near the Hoe, and the sewage would be carried away from the various outfalls by the tidal currents, which were very good. They would thus benefit the Millbay Docks and the Sutton Harbour by taking the sewage away. All the sewers around Sutton Harbour at present had outfalls in the Harbour. They were not now, however, used as outflows but as overflows. The tide, however, got into these sewers and they relieved themselves into the harbour as the tide fell. To some extent, certainly in the western district, the present sewers were insufficient to carry off the flood water. The result of these proposed works would be that the sewage would be carried away to sea more thoroughly than at present. The total area which would benefit by these works would be 763 acres.—Mr. Worth, of the Compton Gifford Local Board, said that two-thirds of the sewage they dealt with at Laira belonged to Plymouth, and he wished to know whether it would not be possible to bring that sewage into the proposed sewers of the Plymouth County Council. The Local Board would, of course, be willing to execute and pay for its part of the work. There were districts growing in the area near Laira Gate without sewerage provision.—Mr. Bellamy said the sewer was not large enough to take all the sewage of Compton Gifford in addition to that portion which the Plymouth authority was under an obligation to take.—Mr. Worth said that with the sewers of the size proposed by Mr. Bellamy it would be practicable to take the sewage for which the Local Board was responsible.—After some further discussion relative to the sewage scheme, the Town Clerk explained the nature of the other works. A vote of thanks to the inspector concluded the inquiry.

PROPOSED NEW WATER SUPPLY FOR EDINBURGH.—The report of Messrs. Gale, Hill, & Mansergh, and Messrs. Leslie & Reid, engineers, on the proposed additional supply of water to Edinburgh and district, has just been issued. The engineers visited several suggested sources of supply at the head waters of the Manor, the Tweed, and St. Mary's Loch. Having considered the merits of the various schemes, and seeing that the Manor water is the nearest source in point of distance to Edinburgh, that the water to be obtained is the best in point of quality, that Parliament did some years ago sanction the appropriation of it for the supply of the Edinburgh district, and having regard to the cost of the first instalment being the least of any of the schemes, they strongly recommend the adoption of the Manor scheme. The estimated cost of the first instalment of the work for 10 million gallons per day for the city, including land and contingencies, with tunnel and cut and cover aqueduct for 24 million gallons per day and one line of pipes for 15 million gallons per day, will be 602,364*l.*, and for the second instalment of 5 million gallons per day, 240,076*l.*, making a total outlay of 842,440*l.* for 15 million gallons of water per day.

RECENT PATENTS.—We are obliged, owing to great pressure on our space, to hold over our usual lists of patents until next week.

STAINED GLASS AND DECORATION.

WINDOWS, ST. LUKE'S CHURCH, LEEK.—Two stained-glass windows have just been placed in St. Luke's Church, Leek, Staffordshire. They each consist of two lights, with tracery above, and are situated in the north and south aisles respectively. The subjects depicted are, in the north aisle, "The Widow's Mite;" and in the south aisle, "St. Paul Preaching at Athens." The work has been designed and carried out by Messrs. Mayer & Co.

MEMORIAL WINDOW, MUTLEY CHAPEL, NEAR PLYMOUTH.—A memorial window is now being executed in the studios of Messrs. James & Co., Willes-road, N.W., for Mutley Chapel, Plymouth. This firm has been specially selected by the trustees in preference to other competitors, their design for the window being the only one deemed suitable. This window is to be in memory of a deceased old Wesleyan minister, and the subject was to be an appropriate memorial. Messrs. James's design illustrates the Parable of the Five Talents. The window, of two lights, will be fixed under the direction of Mr. H. J. Snell, architect, Plymouth.

TOWN-HALL RENOVATIONS, LIVERPOOL. — For some time past the Liverpool Town-hall has been closed to the public, while certain repairs, renovations, and decorations were being effected by Messrs. G. H. Morton & Son, of Liverpool. The building has now been re-opened. The colour scheme adopted differs considerably from that previously used. The luncheon-room is mainly treated in greyish red and ivory tones, and the high dado of embossed ornamentation is the principal decorative object. The smoking-room is treated in cinnamon and Indian red, while the mouldings of the woodwork are in gold and ebony. The adjoining Committee-room presents quite an opposite effect, in tones of dull greenish blue. The walls of the corridors are painted a rich leather colour, heightened by the contrast of the pale blue arched ceilings.

MEMORIAL WINDOW, FRITTENDEN. — A new stained glass window, which has been dedicated to the memory of the late Rev. E. Moore and Lady Harriet, his wife, has just been erected in St. Mary's Church, Frittenden, Kent. The window was designed by Messrs. W. Bucknall and J. N. Comper, of London.

FOREIGN AND COLONIAL.

FRANCE.—The construction of the new bridge over the Seine, between Conflans and Ivry, is being rapidly pushed on.——Two figures of crouching stags have been placed on the terrace "du Connétable" at the Château of Chantilly, commissioned by the Duc d'Aumale from M. Auguste Cain, the well-known sculptor of animal subjects, who has already modelled two dogs for the decoration of the Château. —— The monument to Jeanne d'Arc, in the Basilica of Domrémy, has just been inaugurated with great pomp. A statue of the heroine was inaugurated a few days since at Beaurevoir.——The architects of the Departments of Ardennes, Meuse, Vosges, and Meurthe and Moselle, held their congress last week at Epinal. During the congress they agreed on the adoption of a common tariff of professional charges for all these districts.——The Government has just restored to the Museum at Amiens a fine picture

by Auguste Hess representing "La Séance royale des Etat-généraux en 1789." The work, which was commissioned in 1838, formerly decorated the Chamber of Deputies at Paris.——At Sens there has been recently opened a new art museum, installed in a building specially erected for that purpose. M. Fijalkowski is the architect.——M. Claret, the engineer, who has already constructed an electric tramway between Royat and Montferrand, proposes the construction of another between Royat and the summit of Puy de Dôme, which is probably to be commenced shortly, and will be very useful to visitors to that picturesque region.——It is stated that the eminent painter Ribot, who lives at Colombes, near Paris, is very ill, and that there is little hope of his recovery.

AMALFI.—The *Illustrazione Italiana*, in a recent number, gives an illustration of the new façade to the Cathedral of Amalfi, which has been in progress since 1870, and has just recently been completed. The original designer was Signor Enrico Alvino, in co-operation with whom were Signor Raimondi and Signor Della Corte. Both Alvino and Della Corte died before the completion of the work, which was finished under the direction of Raimondi. The façade is of the basilica outline, with low-pitched gables, most common even in quasi-Gothic churches in Italy; the style is Lombard Gothic, with pointed arches, but with very flat treatment and little predominance of mouldings. A kind of narthex or cloister runs in front of the façade, with open traceried arches; it is reached from the ground by a broad flight of steps in the centre, flanked at the base by pedestals with figures of lions; in the centre of the flight of steps, ranging with the flanking pedestals, is a twisted colonnette bearing a cross. The gable has been filled in with a large design by Signor Domenico Morelli, representing Christ enthroned, with the emblems of the evangelists on each side, and the saints and elders bowed down in adoration and casting their crowns before him. The design is a fine one, showing both energy of treatment and decorative character. It has been executed in mosaic by Messrs. Salviati.

HAMBURG.—The new harbour which is to be built at Cuxhaven as an extension to the Hamburg one will not, as first anticipated, be used solely for commercial purposes. The Emperor wishes the new harbour to be adapted for naval purposes in accordance to a scheme of defence proposed by the late Field-Marshal Moltke, and the plans are to be altered to this purpose.

MISCELLANEOUS.

THE CAMBRIAN ARCHÆOLOGICAL ASSOCIATION IN IRELAND.—We are again obliged, owing to pressure on our space, to hold over our special report of the Cambrian Archæological Association's recent visit to Ireland. It shall appear next week.

GLASGOW ARCHITECTURAL ASSOCIATION.—On the 25th ult. a party of the members of the Glasgow Architectural Association visited Trinity U.P. Church, Pollokshields, now almost completed, and were shown over the building by the architect, Mr. William G. Rowan. The church is Late Gothic in style. Internally at the chancel end the stone is exposed, the other wall surfaces being a rough plaster, coloured a rich gold, and dark wood panelling.

THE GAS QUESTION IN STOCKHOLM.—Some interesting particulars may be gathered from the report of the Stockholm Gas Works for 1890. We learn that the increase in production amounted to 5·6 per cent., and that of public consumption to 8·8 per cent. Private consumption increased by 1·5 per cent., and the consumption in cooking, firing, and mechanical uses by 50·2 per cent. The number of electric glow lamps in the Swedish capital is 13·3 per cent. of that of gas jets, as against 12·1 per cent. at the end of 1889. It will, therefore, be seen that the electric light did not make much progress in the past year; but this is rather due to the circumstance that the public are awaiting the supply from the new municipal electrical works. In respect of constructing the latter, a sum of 21,000*l.* was expended during the year. In spite of the high price of coals the year was a favourable one financially, the profit of the gas works amounting to 73,000*l.*

SANITARY ENGINEERING AT THE YORKSHIRE COLLEGE, LEEDS.—The Council of the Yorkshire College, Leeds, have unanimously appointed to the post of Lecturer on Sanitary Engineering, Mr. William Spinks, A.M.Inst.C.E., of the firm of Spinks & Beever, civil engineers. The creation of the post is the outcome of a grant from the West Riding County Council in aid of technical education, and in furtherance of the scheme it is intended to deliver a course of evening lectures in some of the largest towns in the West Riding. The office was open to public competition, and its tenure will not be incompatible with private professional work.

THE CRYSTAL PALACE ELECTRICAL EXHIBITION, to be opened on January 1 next, has now received the sanction of the Board of Trade, and is duly certified as an International Exhibition, under the provisions of the Patents, Designs, and Trade Marks Act, 1883. This Act provides for the publication of any description of the invention during the period of the exhibition, or the use of the invention for the purpose of the exhibition, or its use by any person elsewhere without the privity or consent of the inventor, without prejudicing the right of the inventor to apply for and obtain provisional protection, and a patent within six months of the opening of the exhibition. The right of application for registration of designs is also protected by this Act for a period of six months from the opening of the exhibition. The exhibits of Her Majesty's Government will include historical, telegraphic, and electrical apparatus, instruments, and appliances, as well as the modern apparatus and instruments now in use in the Postal Telegraph Department. This exhibit will be arranged under the direction of Mr. W. H. Preece, F.R.S.

BUILDING LAND AT CLACTON-ON-SEA.—At a sale of building land held by Messrs. Gilders Bros., on Monday last, twenty-one lots were sold, including a hotel site for 2,000*l.*, the total proceeds of the sale being 3,400*l.*

THE ENGLISH IRON TRADE. — The English iron market continues dull; but pig-iron in the North of England is in somewhat better enquiry. The Glasgow warrant market remains inactive. Scotch makers' iron is very quiet, and several brands are from 6d. to 1s. lower. The hematite pig trade of the north-west is without life, and quotations have again been reduced. Manufactured iron generally is in only moderate demand; but the new shipbuilding contracts secured promise to give more employment to the steel trade. Orders for tin-plates are limited. Engineers are still slack; but shipbuilders are in receipt of more orders. Coal is in fairly good request.—*Iron.*

A NEW BRICK OVEN.—Mr. Henry Warrington, of the Berry Hill Works, Stoke-upon-Trent, has recently patented a brick oven whereby it is claimed that a very great saving of fuel is effected. He is altering all his own ovens to the new principle, and we are told that where they formerly used 12 tons 3 cwt. of fuel they now use only 6½ tons for the same quantity of bricks, and the firing throughout the oven is more equable. The principle may be applied to any old ovens at small cost. Anyone interested can see the ovens at work any day at Berry Hill.

A NEW COMBINED HAND AND POWER MORTISING MACHINE.—Messrs. F. W. Reynolds & Co., of Acorn Works, Blackfriars-road, have just patented a new mortising machine with new action, which deserves the attention of builders and others. It is claimed that this machine, when driven by power, will turn out four or five times more work than can be done with the ordinary hand mortising machine, whilst the cost of it is not much more than for a good hand machine. It also has the great advantage, for small joinery works, where the motive power is not used every day, that it can be worked in the ordinary way as a hand-power machine by simply inserting a T screw into one of the two holes in the counterbalance of the crank. The action of the machine, when driven by power, is remarkably simple. The crank-shaft, at the foot of the machine, drives the side connecting rod and the rocking bar which is attached to the chisel holder, causing this chisel holder to work in its guides, whilst the hand lever remains still. In using the machine the chisel is brought down into its work by lowering the hand lever with the right hand, whilst the left hand moves the work along on the sliding bed by means of the handwheel. The hand lever is simply held still, so that no exertion is required in mortising, the engine meanwhile doing the work. The machine is fitted with fast and loose driving pulleys, and striking gear for belt.

LEGAL.

AN IMPORTANT DECISION AS TO NEW ROADS.

AT the North London Police-court, on Thursday, the 27th ult., Messrs. Isaac Edmondson & Son, builders, were summoned before Mr. Haden Corser by the London County Council for unlawfully laying out a road, passage, or way, called or known as "Newington-turning," as a public carriageway, in such a manner that such road, passage, or way would not directly communicate at both ends with a public carriageway, contrary to the 53rd and 54th Victoria, cap. 243.

Mr. Buckmaster, who appeared for the London County Council, stated that the defendants had laid out one portion of Newington-turning as a carriageway to the full width of 40 ft., but they had failed to make the whole of the footway a carriageway.

Mr. C. Glen was counsel for the defendants, and stated that when the building estate was finished, Newington-turning would be intersected by another carriage-way or road which had already been staked out, and he produced a plan showing this arrangement. He also referred to an estate at Herne-hill, where the road was not 40 ft. in width.

Mr. John Hebb, Assistant Architect to the County Council, Mr. Henry Lovegrove, the District Surveyor, the surveyors to the estate, Mr. C. Herbert Shoppee, and Messrs. Buckland, Garrard, and C. J. Bentley, were in attendance, but only Mr. Hebb gave evidence.

Mr. Corser dismissed the summons, with 5*l.* 5s. costs, and notice of appeal was given.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

AUGUST 24.—By *Thomas, Peyer, & Miles*: The "Rose and Crown" public-house, Harpenden, Herts, c. and f., 1,250*l.*; the "Half Moon" public-house, Peter's Green, near Luton, and 3a. 1r. 7p., f., 1,000*l.*; a plot of f. land, 2a. 0r. 15p., 120*l.*; an enclosure of f. land and two cottages, 15a. 1r. 27p., 450*l.*

AUGUST 26.—By *D. J. Chattell*: 1 to 10, Alexandra-ter., Bowes Pk., u.t. 87 yrs., g.r. 55*l.*, 520*l.*; 11, 12, and 13, Alexandra-ter., u.t. 87 yrs., g.r. 16*l.* 10s., r. 78*l.*, 250*l.*; 1 to 5, Riverside-ter., u.t. 87 yrs., g.r. 25*l.*, r. 124*l.* 16s., 250*l.*; 6 to 9, Riverside-ter., u.t. 87 yrs., g.r. 20*l.*, r. 93*l.* 12s, 330*l.*; 1 to 5, Granville-villas, u.t. 87 yrs., g.r. 25*l.*, r. 90*l.*, 440*l.*

AUGUST 27.—By *G. Brinsley*: 1 to 7, Triangle-pl., Clapham, and a plot of land, f., r. 185*l.* 2s., 1,250*l.*—By *E. Stimson*: 102 to 108 even, Peckham-rye, u.t. 28 yrs., g.r. 28*l.* 18s., r. 152*l.*, 420*l.*; 58, Ball's Pond-rd., Islington, u.t. 60 yrs., g.r. 6*l.* 10s., r. 45*l.*, 345*l.*; 227 and 229, Beresford-st., Walworth; u.t. 58 yrs., g.r. 7*l.* 15s., r. 54*l.*, 560*l.*; 30 to 36 even, Wellington-st., Newington, u.t. 19 yrs., g.r. 18*l.*, r. 132*l.* 12s., 480*l.*; 13 and 14, Bath-st., Southwark, u.t. 49 yrs., g.r. 9*l.*, r. 63*l.* 14s., 360*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; l.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	9/0/0
Teak, E.I... load	8/0/0	14/0/0
Sequoia, U.S.ft.cu.	2/3	3/0
Ash, Canada load	2/5/0	4/0/0
Birch, do.	2/5/0	4/5/0
Elm, do.	3/5/0	4/15/0
Fir, Dantsic, &c.	2/0/0	3/10/0
Oak, do.	2/10/0	4/10/0
Canada.....	4/17/6	6/10/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/0/0	5/0/0
Lath, D'ntsic, fath	5/0/0	6/0/0
St. Petersburg	5/0/0	7/0/0
Deals, Finland, 2nd & 1st std 100	7/15/0	10/0/0
Do, 4th & 3rd..	7/5/0	8/5/0
Do. Riga	8/5/0	7/15/0
St. Petersburg, 1st yellow ..	9/15/0	14/0/0
Do. 2nd yellow	8/5/0	9/5/0
Do. white	6/15/0	10/0/0
Swedish	6/15/0	15/10/0
White Sea	8/5/0	17/0/0
Canada, Pine 1st	12/10/0	24/0/0
Do. do. 2nd....	9/0/0	15/10/0
Do. do. 3rd, &c.	6/10/0	10/0/0
Do. Spruce. 1st	8/0/0	10/10/0
Do. do. 3rd & 2nd.....	6/0/0	7/10/0
New Brunswick	5/5/0	7/5/0
Battens, all kinds	3/10/0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/10/0	0/13/6
Do. 2nd.....	0/9/0	0/10/6
Other qualities	0/4/6	0/7/6
Cedar, Cuba ..ft.	/4	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4½	/6½
Mexican do. do	/4½	/5
Tobasco do. do	/5½	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	13/0/0
Rose, Rio.....	10/0/0	20/0/0
Bahia	9/0/0	18/0/0
Satin, St. Domingo . ....ft.	0/0/9	0/1/3

TIMBER (*continued*).		
Satin, Porto Rico	0/0/10	0/1/6
Walnut, Italian..	0/0/3½	0/0/7
METALS.		
IRON—Pig, in Scotland .....ton	47/0/0	47/1/0
Bar, Welsh, in London.....	6/0/0	6/2/6
Do. do. at works in Wales	5/10/0	5/12/6
Do. Staffordshire, in London	6/10/0	6/15/0
COPPER—British, cake and ingot	54/10/0	56/0/0
Best selected ..	56/0/0	57/10/0
Sheets, strong..	65/0/0	66/0/0
Chili, bars	52/10/0	52/17/6
YELLOW METAL lb.	0/0/5½	0/0/6½
LEAD—Pig, Spanish ....ton	12/2/6	12/5/0
English, com. brands	12/7/6	0/0/0
Sheet, English, 3 lbs. per sq. ft. and upwards ..	14/0/0	0/0/0
Pipe	14/10/0	0/0/0
ZINC—English sheet .....ton	27/0/0	0/0/0
Vieille Montagne.....	27/10/0	0/0/0
TIN—Straits	92/0/0	92/10/0
Australian	92/0/0	92/10/0
English Ingots	94/10/0	95/10/0
OILS.		
Linseed .....ton	20/2/6	20/7/6
Cocoanut, Cochin	30/0/0	30/10/0
Do. Ceylon	26/0/0	0/0/0
Palm, Lagos	25/10/0	0/0/0
Rapeseed, English pale	32/5/0	0/0/0
Do. brown	30/15/0	0/0/0
Cottonseed ref...	20/10/0	0/0/0
Oleine	0/0/0	0/0/0
Lubricating, U.S.	5/0/0	5/10/0
Do. refined	8/0/0	11/0/0
TAR—Stockholm barrel	0/18/0	0/18/6
Archangel	0/12/0	0/12/6

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BIDEFORD (Devon).—For the erection of a new Wesleyan Chapel, Bideford. Messrs. W. G. Habershon & Fawckner, architects, London, Newport, and Cardiff:—

Cock & Lammerton (accepted).....	£4,663 0 0

BOURN (Lincs.)—For the erection of school and class-rooms, West-street. Mr. F. G. Shilcock, architect, Bourn:—

Blood	£278	3	2	Greenfield.....	£218 10 0*
Jos. Story	252	0	0	Chappell, Bourn*	218 7 6
Woolston	220	0	0	* Accepted.	

BRIGHTON.—For the erection of shops and lavatories, in Grafton-street, for the Corporation of Brighton. Mr. F. J. C. May, C.E., Borough Surveyor:—

C. E. Kemp	£1,466	J. T. Chappell	£1,030
G. R. Lockyer	1,258	W. & T. Garrett	1,026
V. P. Freeman.....	1,120	J. Barnes	1,015
Cheesman & Co.	1,100	W. A. Field (accepted)....	989
J. Longley & Sons	1,095	Stevens	968

CARDIFF.—For the erection of residence, the Crescent, for Mr. James Howell. Messrs. W. G. Habershon & Fawckner, architects, Newport and Cardiff:—

Jones Bros.	£4,320 0	Shepherd & Son, Lim...	£3,989 0*
D. G. Davies	4,100 0	Shepton & Sons, Cardiff*	3,920 10
C. E. Dunn	4,029 0	* Accepted.	

CARDIFF.—For the erection of Wesleyan Methodist Sunday Schools, Conway-road, Canton. Messrs. W. G. Habershon & Fawckner, architects, Newport and Cardiff:—

D. G. Davies.....	£3,300	T. Gough	£2,775
G. Griffiths	3,099	Turner & Sons	2,688
Thomas & James.....	2,942	G. E. Griffiths, Cardiff....	2,550
H. Davies	2,915	* Accepted.	

CARDIFF.—For the erection of new Mission Hall, Carlisle-street, Splottlands, Cardiff, for the Rev. J. Pugh. Messrs. W. G. Habershon & Fawckner, architects, Newport and Cardiff:—

G. Griffiths	£2,384 0 0	T. Gough	£2,011 0 0
H. Davies	2,224 12 3	Thomas & James,	
Turner & Sons	2,068 0 0	Cardiff (accepted)..	2,000 0 0

CARDIFF.—For building a new Welsh Baptist school-room, Walker-road, Cardiff. Messrs. W. G. Habershon & Fawckner, architects, Newport and Cardiff:—

T. Gough	£658	Williams & Thomas, Barry	
J. Hopkins	645	Dock (accepted)	£640

CARDIFF.—For the erection of a Welsh Methodist school-room, Walker-road, Splottlands. Messrs. W. G. Habershon & Fawckner, architects, Newport and Cardiff:—

Williams & Thomas	£615	Thomas & James	£470

CROYDON.—For the erection of a house, Selborne-road, East Croydon, for Mr. Ramsey Atkins. Mr. G. Fusch, architect :—

Hart Bros.	£2,247	Page	£2,075
Batly & Sinfoot	2,213	Bryan & Son	2,073
Saunders	2,170	M. Taylor (accepted)	2,050

DARTFORD.—For the erection of a boiler-house at the Gore Farm Hospital, for the Metropolitan Asylums Board. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. :—

Butler Bros.	£1,275 0	Knight	£1,135 0
W. Neil	1,145 10	C. Miskin, St. Albans*.	976 0

* Accepted.

DEVONPORT.—For certain alterations and additions to St. John's National Schools, Devonport, for the Managers. Mr. H. G. Luff, architect, Devonport :—

Littleton	£522 0	G. Smith & Son*	£508 19
Greenslade	510 0		

* Accepted.

DEVONPORT.—For alterations and additions to the "Barnstaple" Inn, Princes-street, Devonport, for the Plymouth Breweries Co. Mr. H. G. Luff, architect, Devonport :—

Littleton	£497 0	G Smith & Son	£439 15
Jenkin & Son	493 0	Greenslade*	433 0
Healy	462 0		

* Accepted.

DEVONPORT.—For alterations and additions to the premises, No. 113, Fore-street, Devonport, for the Directors of the Capital and Counties Bank, Limited. Mr. H. G. Luff, architect, Devonport :—

Healy	£594	G. Smith & Son	£556
Greenslade	579	Jenkin & Son*	554
Littleton	561		

* Accepted.

DULWICH.—For alterations and repairs to No. 3, Wood-vale, Lordship-lane, for the Dulwich and Forest Hill Public Hall Co. :—

		Pointing.
Maley	£169 10	£16
T. Watson	168 10	20
Masters	157 0	18

FOREST GATE (Essex).—For building public hall. Mr. J. Kingwell Cole, architect. Quantities by Mr. Edward S. Mansergh, 28, Mount-street, Grosvenor-square, W. :—

S. Chafen	£2,010	James Morter	£1,615
W. J. Hack	1,847	A. E. Faulkner	1,570
Harris & Wardrop	1,789	G. Neal	1,568
Dove Bros.	1,675	Osborn & Son*	1,517
Nightingale & Co.	1,638		

* Accepted.

HEATHFIELD (Sussex).—For alterations and additions to stabling. Mr. H. Percy Monckton, architect, 32, Walbrook, E.C. :—

S. Piper (accepted) £246 0 0

LITCHFIELD (Hants).—For the erection of a village club, for Mr. W. H. Kingsmill. Mr. James H. Money, architect, Newbury. No quantities supplied :—

E. James & Son	£550	W. & C. Garrett, Kingsclere*	£472
W. G. Adey	475		

* Accepted.

LONDON.—For partly rebuilding houses in Nottingham-place, Marylebone, for Mr. A. Craddock. Mr. W. Lambert, architect, 49, Finsbury-pavement, E.C. :—

N. Lidstone (accepted) £1,689 0 0

LONDON.—For additions, alterations, repairs, &c., to 21, St. John's Wood-road, N.W., for Dr. Hickman. Mr. W. H. Syme, architect, Watford :—

Godden	£1,250	Time not stated.
Head	1,185	Time not stated.
Rd. Wright	1,131	3 months.
Haylock	1,099	14 weeks.
N. Lidstone	1,032	3 months.
Manktelow	975	3 months.

LONDON.—For erecting new coach-house and stables, Beaumont-mews, Marylebone, W., for Mrs. Drewell. Mr. W. Campbell Jones, architect, 32, Bedford-row, W.C. :—

Rider	£1,869	Holloway	£1,671
Simpson	1,770	Turner	1,647
Clifton	1,723	N. Lidstone*	1,609
Perry	1,722		

* Accepted.

LONDON.—For alterations at 21 to 28, Holles-street, W., for Messrs. Lewis & Co. :—

A. Lidstone (accepted) £236

LONDON.—For sanitary work and repairs at No. 27, Cavendish-square, for Mr. J. W. Birch. Mr. F. le Rossignol, F.S.I., architect and surveyor, 2, Gresham-buildings, Basinghall-street, E.C. :—

W. Whiteley ..... £246 15 0 | J. Langham (accepted) £210 0 0

LONDON.—For alterations and repairs to warehouse, Crawford-passage, Clerkenwell, E.C. Mr. H. Percy Monckton, architect, 32, Walbrook, E.C. :—

Harrison & Spooner ..... £123 | E. A. Roome (accepted) £108

LONDON.—For alterations and additions to No. 8, Lincoln's-inn-fields. Mr. H. Percy Monckton, architect, 32, Walbrook, E.C. :—

Bargman & Son	£429 0 0	Walter B. Briant	£322 7 6
Turtle & Appleton	348 0 0	B. E. Nightingale*	320 0 0

* Accepted.

LONDON.—For the erection of business premises, No. 52, Welbeck-street, W., for Mrs. Gabrielle Jinks. Mr. R. Cruwys, architect, 465, Brixton-road, S.W. Quantities by Messrs. Franklin & Andrews, 25, Ludgate-hill, E.C. :—

Chappell	£11,129	Higgs & Hill	£10,340
Nightingale	10,893	Downs	10,277
Lascelles	10,567	Bywaters	9,678
Hussey	10,500	Patman & Fotheringham	9,563

LONDON.—For new shop fascia, &c., to No. 272, Edgware-road, for the executors of the late Mr. E. Grove. Mr. Herbert Knight, architect, 129, Cheapside :—

F. Pratt (accepted) £168 5 0

LONDON.—For alterations at the "Opera Tavern," Haymarket, for Miss Farmer. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster :—

Burman & Son	£1,450	Gould & Brand	£1,015
Godden	1,425	C. Dearing & Son	997
Marks	1,399	Edwards & Medway	982
Osborn	1,070		

LONDON.—For the erection of a dwelling-house and shop, Willesden-lane, for Mr. G. Wills. Mr. Reginald G. Wills, architect, 65, Willesden-lane, Kilburn :—

F. Colwill	£620	Hy. Tenant	£575
T. Baker	600	R. Barclay (accepted)	550

LONDON.—For the erection of a dwelling-house and shop in the Willesden-lane, for Mr. C. Harris. Mr. Reginald G. Wills, architect, 65, Willesden-lane :—

W. Sumners	£722	A. Prior	£620
R. Barclay	621	R. Tofield*	597
W. Gregory	620		

* Accepted.

LONDON.—For the erection of a dwelling-house and baker's shop in the Willesden-lane, for Mr. C. Fuchs. Mr. Reginald G. Wills, architect, 65, Willesden-lane, N.W. :—

G. Johnson (by agreement) £850 0 0

LONDON.—For the erection of shop fittings, &c., in the Finchley-road, Hampstead, for Messrs Paterson & Young. Mr. Reginald G. Wills, architect, 65, Willesden-lane, N.W. :—

W. Sumners ..... £162 | Hy. Tenant (accepted) £135

LONDON.—For the erection of two small dwelling-houses in the Tennyson-road, for Mr. R. Rawley. Mr. Reginald G. Wills, architect, 65, Willesden-lane, N.W. :—

C. Midson (by agreement) £800 0 0

LONDON.—For the rebuilding of No. 66, Finsbury-pavement, E.C. Mr. Theodore K. Green, architect, 70, Finsbury-pavement :—

Brass & Co.	£2,444	G. Lyford	£2,200
W. Scrivener & Co.	2,368	Roberts	2,198
Woodward & Co.	2,320	Pearce & Co.	2,127
T. Nye	2,275	J. Morter	1,910
Dove Bros.	2,250	S. & W. Pattinson*	1,789

* Accepted.

LONDON.—For the repairs, new roof, &c., to the bonded store, Holland's Distillery, Deptford, for Messrs. Holland & Co., Limited. Mr. T. J. Lambert, architect, Norgrove-buildings, 59, Bishopsgate-street, E.C. :—

Charles A. King	£748	Holloway	£693
Wood	723	Hewlitt*	571
Hearle & Farrow	696		

* Accepted.

LONDON.—For the erection of new shop-front to No 266, Mile End-road, for Mr. J. Cohen. Messrs. Hammack & Lambert, architects, Norgrove-buildings, 59, Bishopsgate-street, E.C. :—

Vear	£383	F. & F. J. Wood*	£345
Drew & Cadman	370		

* Accepted.

LONDON.—For the re-arrangement of the drainage and sanitary works at No. 39, Warrington-crescent, Maida-hill, W., for Mr. Wm. Flux. Mr. J. Slater, architect, 46, Berners-street, W. :—

J. Goy & Son, Brondesbury, N.W. (accepted) £114

LONDON.—For general repairs, cleaning, and decorating at No. 39, Warrington-crescent, Maida-hill, W., for Mr. Wm. Flux. Mr. J. Slater, architect, 46, Berners-street, W. :—

Manktelow & Co.	£150
J. Goy & Son, Brondesbury, N.W. (accepted)	111

NEW BROMPTON (Kent).—For building four houses at St. Mark's-terrace, New Brompton, Kent, for Mr. A. Lewis. Mr. James W. Nash, architect, Rochester :—

A. Smith	£1,150	C. E. Skinner	£845
Nye Bros.	872	E. G. Brown, Halling*	792

* Accepted.

NEW BROMPTON (Kent).—For building new shop, stores, stables, cottage, &c., at New Brompton, Kent, for the Co-operative Society. Mr. James W. Nash, architect, Rochester. Quantities by the architect :—

T. Goldfinch	£3,430 0	C.E.Skinner, Chatham*	£2,980 0
G. Gates	3,175 0	F. Stevens	2,939 10
W. C. Snow	3,150 0		

* Accepted.

NEWPORT (Monmouthshire). — For building new business premises, Griffin-street, for Mrs. S. Huntly. Messrs. W. G. Habershon & Fawckner, architects, Newport :—

J. Linton	£1,430	W. M. Blackburn	£1,365
W. Price	1,420	W. A. Linton	1,342
T. G. Diamond	1,420	A. Hazell	1,329
J. Matthias	1,400	Morgan & Roberts, Newport (accepted)	1,295
Moulton & Brownscombe	1,390		
J. T. Morris	1,385		

NEWPORT (Monmouthshire).—For building a new Bible Christian Chapel, Hereford-street, Maindee, Newport. Messrs. W. G. Habershon & Fawckner, architects, Newport :—

T. G. Diamond	£998 0	W. A. Linton	£870 0
C. Lock	950 0	E. Richards	865 0
Morgan & Roberts	892 0	Matthias	849 10
W. Price	889 0	J. T. Morris	940 0
W. Bate	880 0	W. Moore	827 0
Moulton & Brownscombe	872 0	J. D. Parfitt*	809 0

* Accepted.

[All of Newport.]

SALFORD.—For lighting the new Ladywell Sanatorium by electricity, for the county borough of Salford. Messrs. Maxwell & Tuke and E. & F. Hewitt, joint architects :—

R. A. Scott	£2,545	Holmes & Co.	£1,630
Siemens Bros. & Co.	2,200	Mather & Platt	1,627
Ch. Mellier	2,167	Edmundsons, Limited	1,591
Fowler, Lancaster, & Co.	2,125	Electric Installation Co.	1,575
J. C. Howell	2,100	Parsons & Co.	1,570
Drake & Gorham	2,080	West-End Electric Co.	1,546
Anderson & Munro	2,034	Gulcher Electric Co.	1,535
Sharp & Kent	1,975	Andrews & Co.	1,516
Walter Leake	1,912	John Pearce	1,450
Paterson & Cooper	1,900	Mercier, Corlett, & Co.	1,445
General Electrical Power Co.	1,847	Brush Electric Corporation	1,431
Swinburn & Co.	1,841	General Electric Co.	1,425
E. Scott & Mountain	1,790	H. A. Clegg	1,388
City Electric Light Co.	1,765	R. & H. Dobson	1,352
Barclay & Sons	1,665	Alterion Co., Limited	1,345
Charleswood, Hall, & Co.	1,655	C. E. B. Pritchett	1,320
India-Rubber, Gutta-Percha Co.	1,640	Manchester Edison Swan Co. (with extra powerful dynamo) (accepted)	1,312
Ropers Engineering Co.	1,640	W. Rowbottom & Co.	1,020

SELHURST (Surrey).—For erecting six shops for Mr. Topping :—

Taylor	£3,525	Smith & Sons	£3,389
T. Watson	3,500	Batley & Linfoot	3,072
Somerford & Son	3,399		

SEVENOAKS.—For alterations and additions to cottage on the Warren Estate. Mr. H. Percy Monckton, architect, 32, Walbrook, E.C. :—

Semark	£230 0 0	Avard	£171 0 0
Iggulden	210 0 0	Allcorn & Son*	144 17 8

* Accepted.

TOTTENHAM.—For the erection of shops and office adjoining the "Black Boy" Hotel, for Mr. C. W. Tame. Messrs. Hodson & Whitehead, architects, 7, Finsbury-square, E.C. :—

M. A. Brown & Co. (accepted) £1,620 0 0

WIMBLEDON.—For the erection of three houses, Gladstone-road. Mr. R. Cruwys, architect, 465, Brixton-road, S.W. :—

Cromwell	£1,513	Heywood	£1,174
Ackermann	1,187	Bryant (accepted)	822

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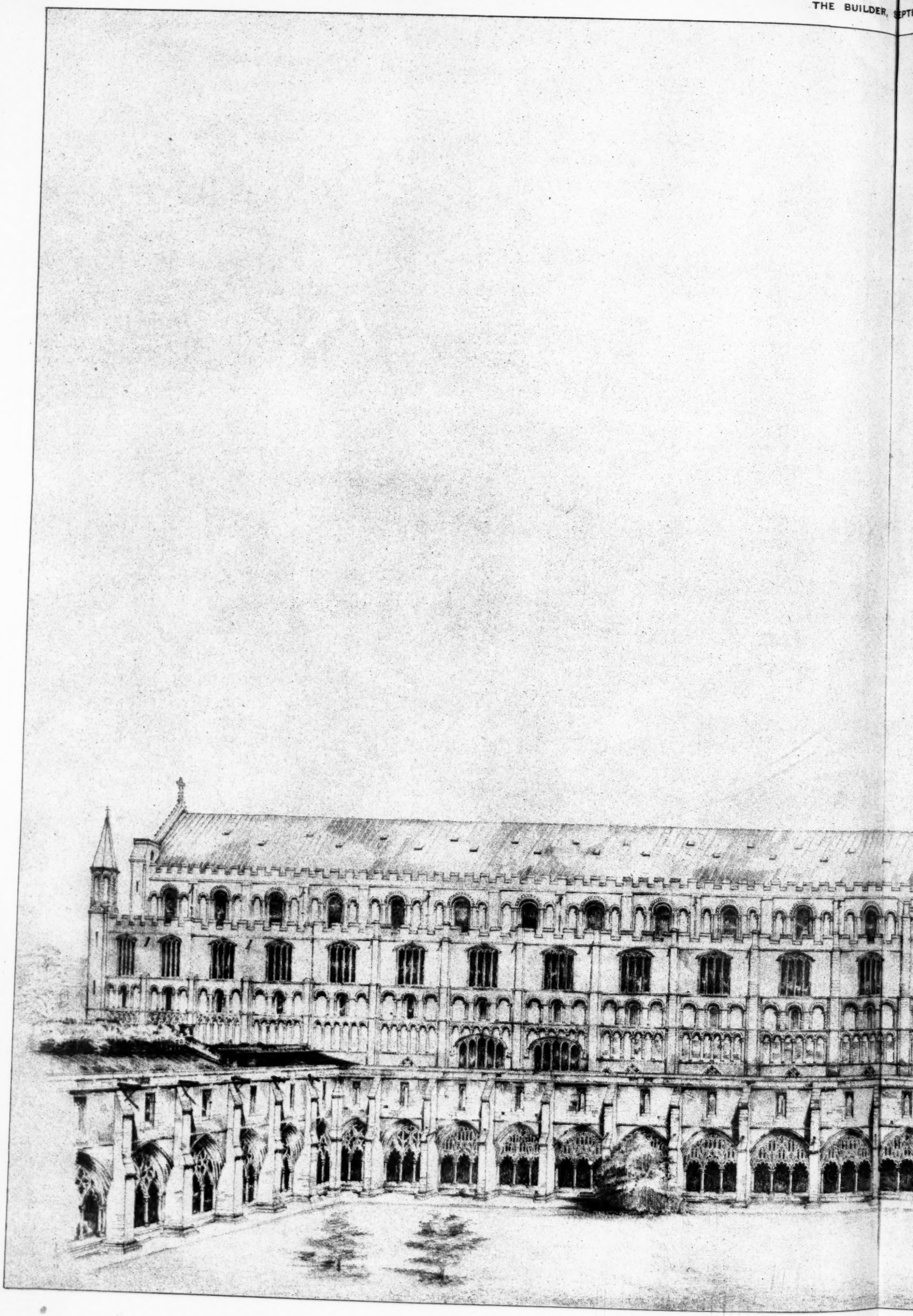

Cathedrals of England

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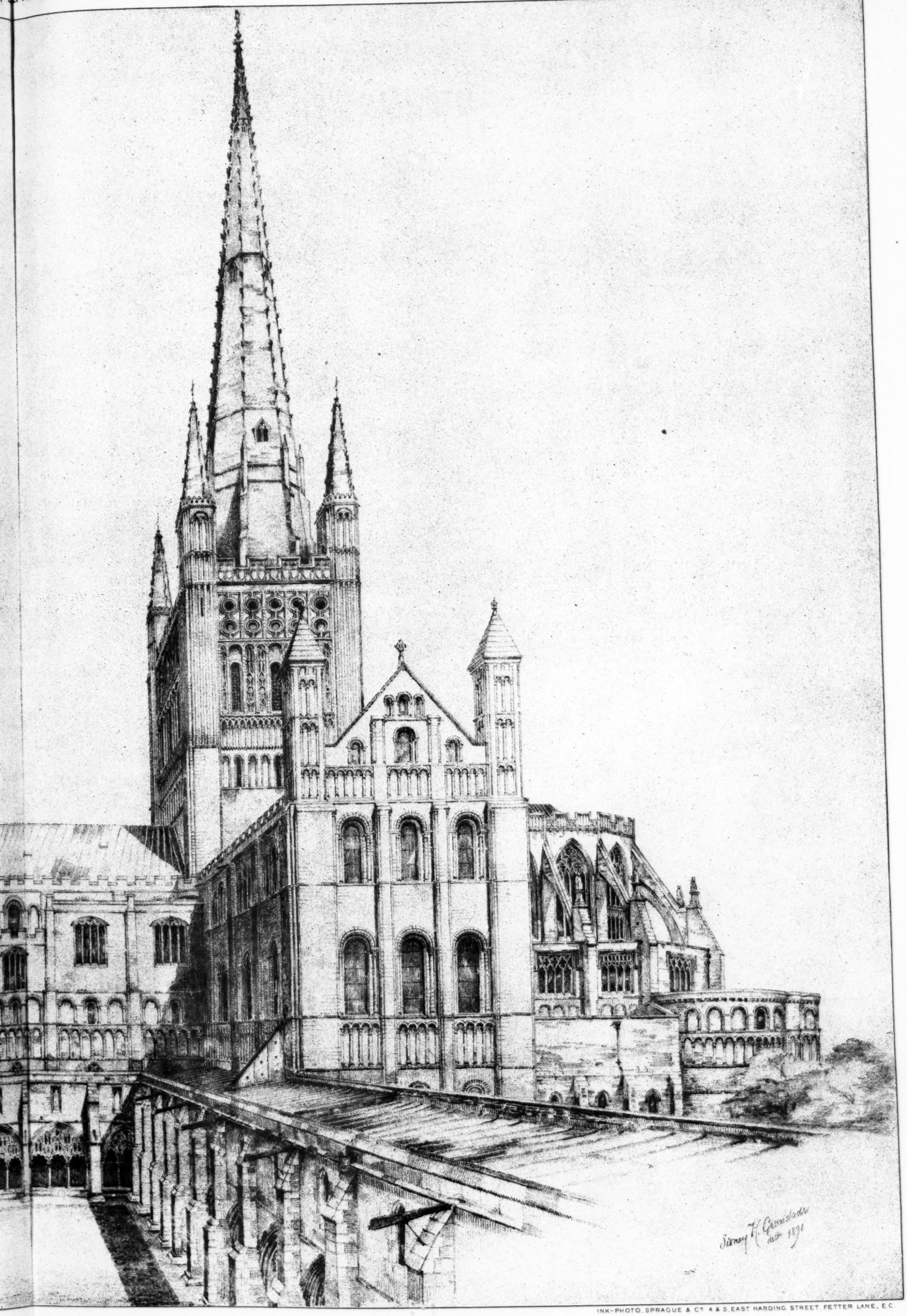

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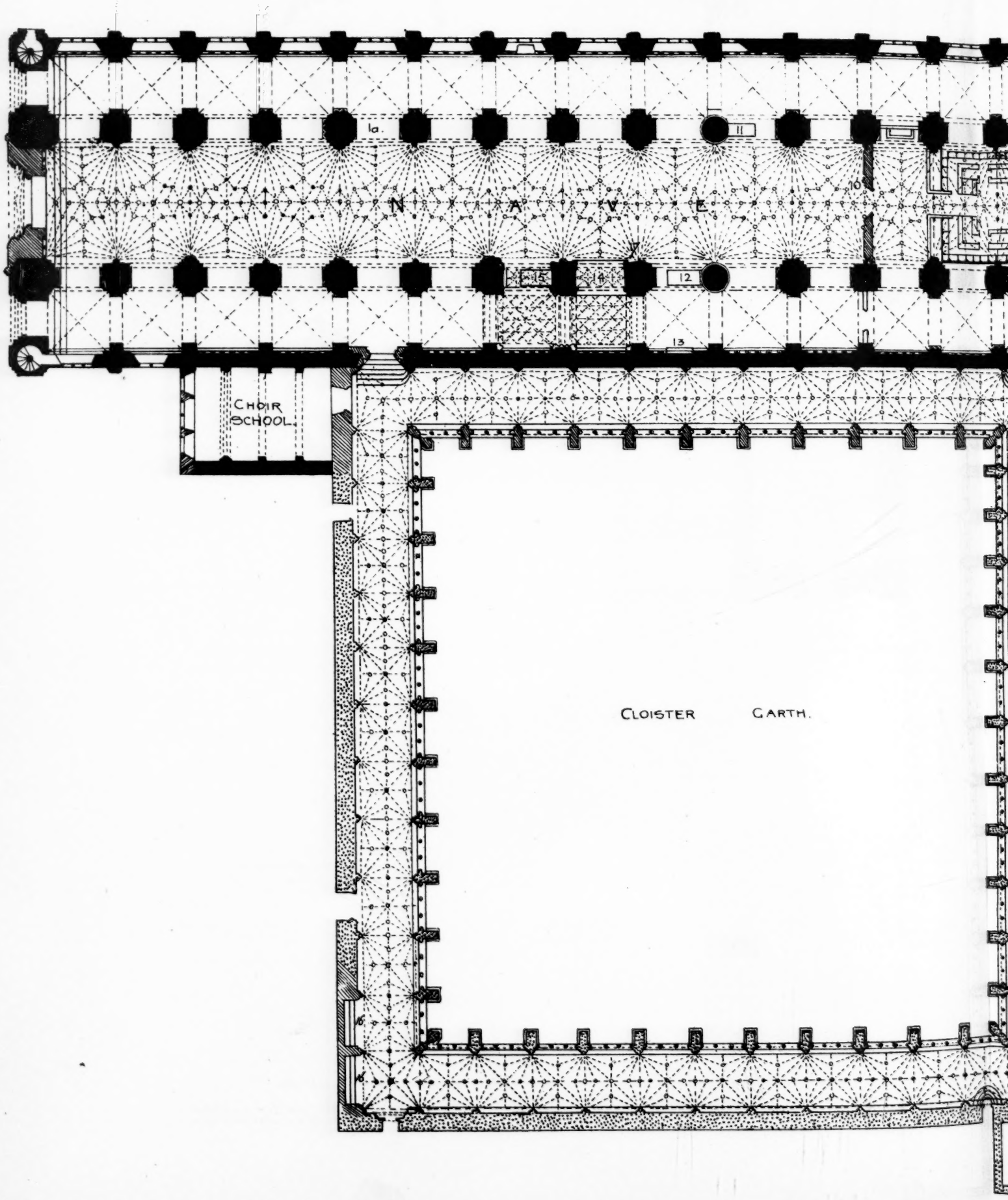
England and Wales.

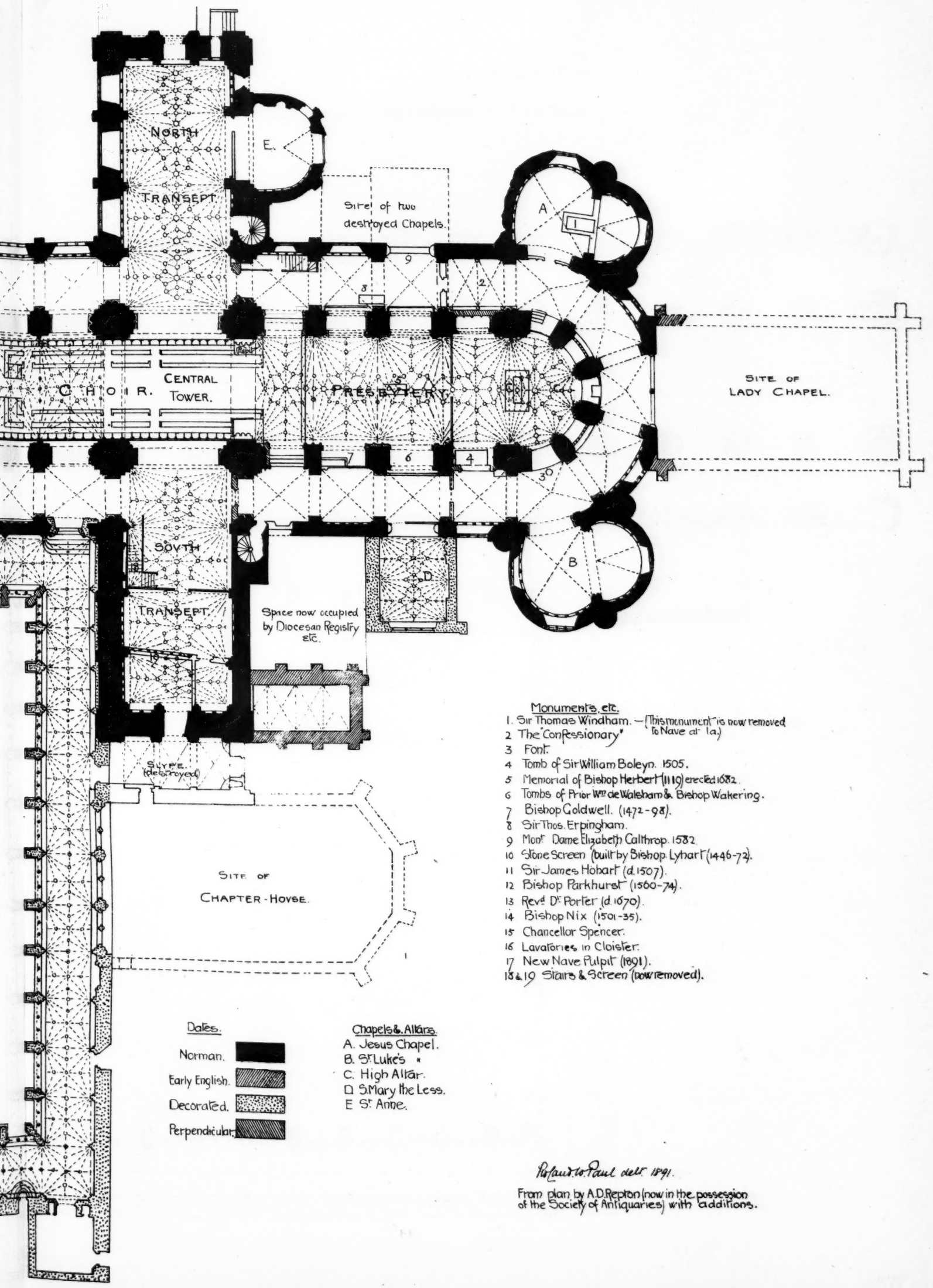
UTH CLOISTER.—Drawn by Mr. S. K. Greenslade.

NORWICH CATHEDRAL

GROVND PLAN.

Scale 0 10 20 30 40 50 100 Feet.





Monuments, etc.

1. Sir Thomas Windham. — (This monument is now removed to Nave at 1a.)
2. The Confessionary.
3. Font.
4. Tomb of Sir William Boleyn. 1505.
5. Memorial of Bishop Herbert (1119) erected 1682.
6. Tombs of Prior Wm de Walsham & Bishop Wakering.
7. Bishop Goldwell. (1472-98).
8. Sir Thos. Erpingham.
9. Mont. Dame Elizabeth Calthrop. 1582.
10. Stone Screen (built by Bishop Lyhart (1446-72).
11. Sir James Hobart (d. 1507).
12. Bishop Parkhurst (1560-74).
13. Revd Dr Porter (d. 1670).
14. Bishop Nix (1501-35).
15. Chancellor Spencer.
16. Lavatories in Cloister.
17. New Nave Pulpit (1891).

18 & 19 Stairs & Screen (now removed).

Roland to Paul delt 1891.

From plan by A.D. Repton (now in the possession of the Society of Antiquaries) with additions.

PHOTO-LITHO. SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

Uppingham School.
The new Library
Thos. G. Jackson.
Architect
Mar. 23 - 1891 -

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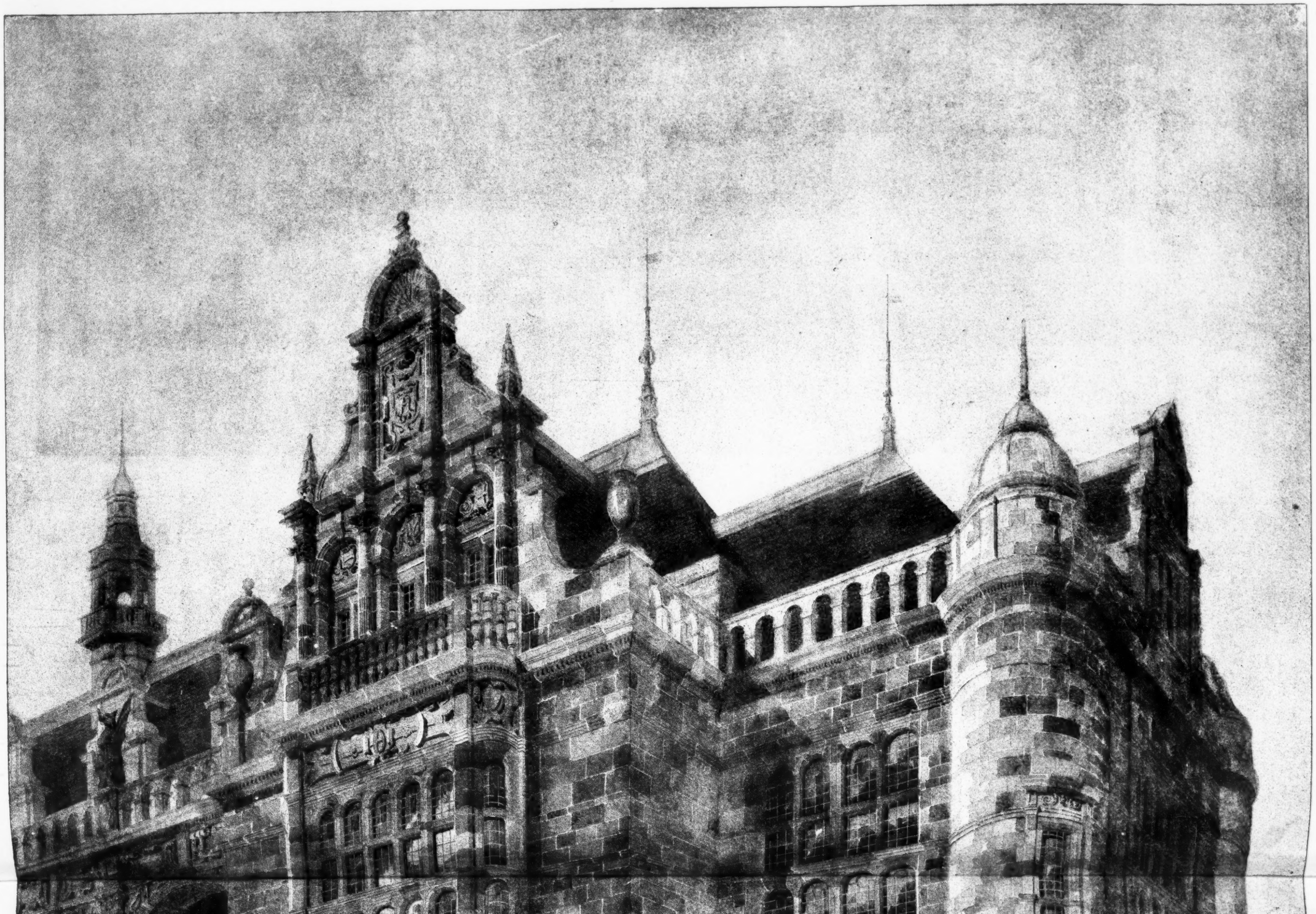
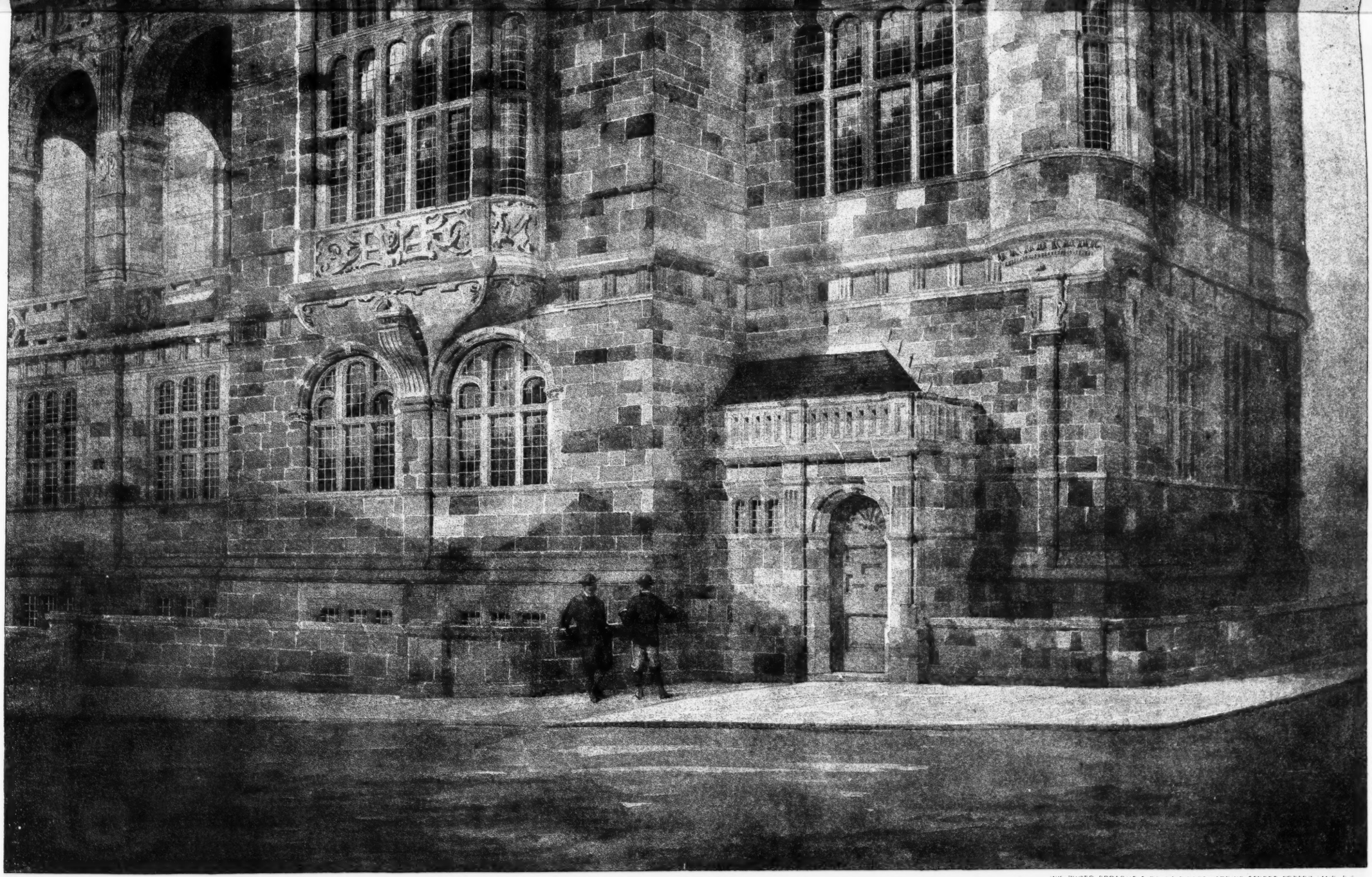
Royal Academy Exhibition, 1891.





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Royal Academy Exhibition, 1891.